



HIGHLIGHTS

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AT DYPIU

THE SCIENCE BEHIND THE FEAR OF THE IRRATIONAL

Phobias are not just fancy terms for unreal things. Here's why.

"If you want an output, you have to put in some or the other input every day."

Ashwajeet Singh
BCA

**GUT GAZETTE:
THE DIGESTIVE
DELIGHTS AND
BRAINY INSIGHTS**

Do brain cells have a connection with our gut?

FIND OUT

EKKO- MUSIC
PLAYER OF
THE FUTURE

PANDEMICS
UNMASKED

THE ONYO
PROGRAMMING
LANGUAGE

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Preface

Seasons, ecosystems, the fundamental laws of nature, and life are all as old as time itself. What has changed is our perception of these actualities from fearing to worshipping, to understanding, to altering, and eventually birthing the impossible, we have come a long way. Essentially, science has come a long way and still has an eternity of development ahead.

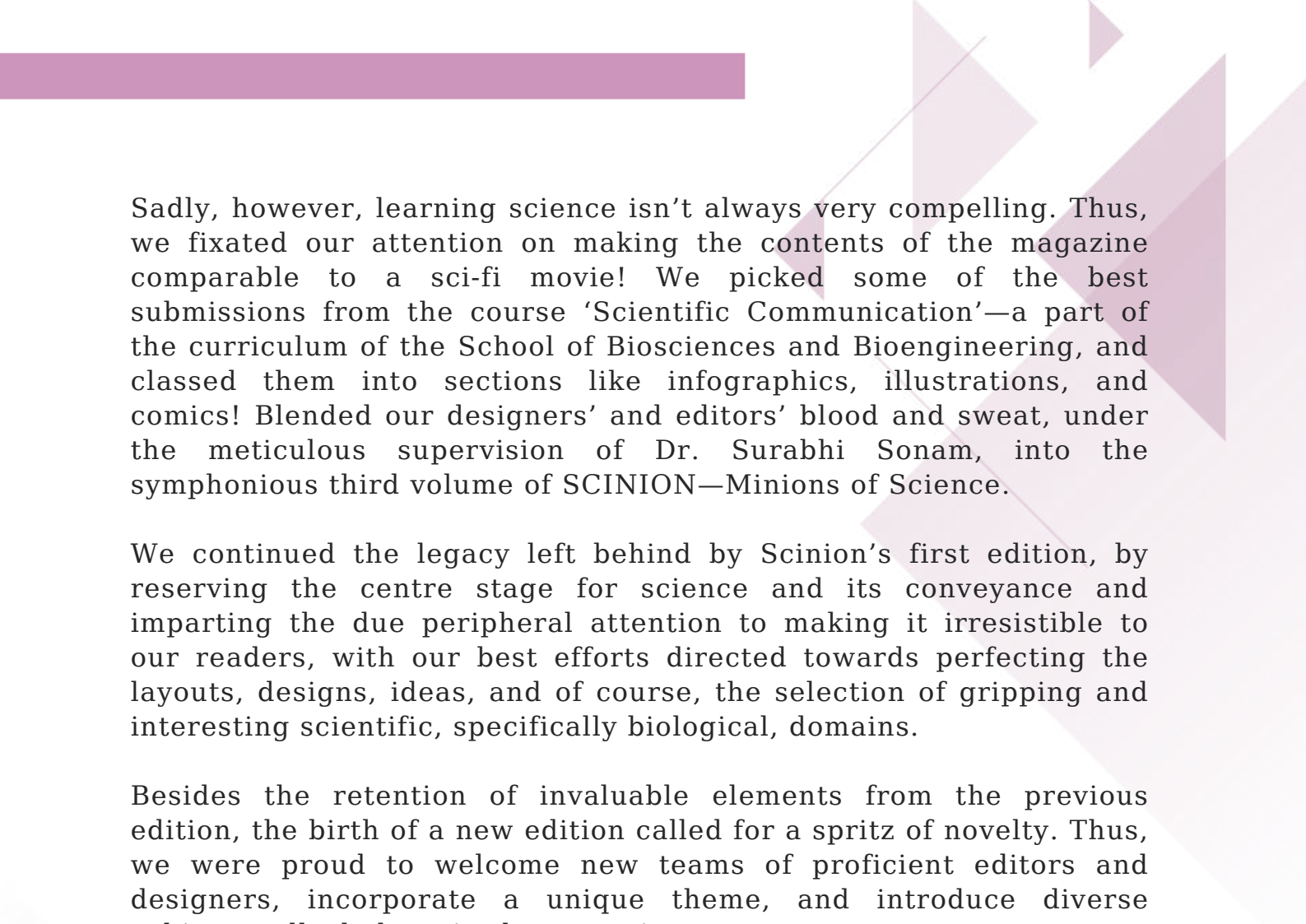
The world presented its mysteries and we uncovered them. We devoted ourselves to scientific brilliance as its disciples. So what are we? We believe ourselves to be the 'minions of science' and proudly so!

Science has unfailingly kept us seeking answers, ever since humans first set foot on earth and still has us perplexed about countless unanswered questions, offering a multiverse of potential progress. We unanimously feel an overwhelming sense of gratitude and awe for witnessing and learning about the universe's marvels and all hail be to science!

And as history would have it, the world has had several occasions of 'accidental' discoveries that have turned the world around!

This only goes to show that science doesn't always come from learned or prodigal masters of their subjects. Sometimes, amateur enthusiasts, too, have bewildered the world with their revolutionary innovations and scientific prowess!

Groundbreaking instances like these ignite hope in us and this very idea of 'science for all' was largely our inspiration during the conception of the magazine. Communicating and propagating science among not just the scientific community, but also among enthusiasts and, even, among science-deprived folks assumes the central endeavour of our team.



Sadly, however, learning science isn't always very compelling. Thus, we fixated our attention on making the contents of the magazine comparable to a sci-fi movie! We picked some of the best submissions from the course 'Scientific Communication'—a part of the curriculum of the School of Biosciences and Bioengineering, and classed them into sections like infographics, illustrations, and comics! Blended our designers' and editors' blood and sweat, under the meticulous supervision of Dr. Surabhi Sonam, into the symphonious third volume of SCINION—Minions of Science.

We continued the legacy left behind by Scinion's first edition, by reserving the centre stage for science and its conveyance and imparting the due peripheral attention to making it irresistible to our readers, with our best efforts directed towards perfecting the layouts, designs, ideas, and of course, the selection of gripping and interesting scientific, specifically biological, domains.

Besides the retention of invaluable elements from the previous edition, the birth of a new edition called for a spritz of novelty. Thus, we were proud to welcome new teams of proficient editors and designers, incorporate a unique theme, and introduce diverse subjects talked about in the magazine.

All said and done, the making of this edition wasn't exactly a cinch. The final magazine was shaped after multiple rounds of revising the textual contents by the team of editors and weeks of exhausting ideation, creative efforts, and countless design improvisations by the designers.

After involuted months of hard work, we present to you the third volume of Scinion.

We earnestly hope that you enjoy every bit of the magazine!

Team Scinion



Acknowledgement

We would like to express our special thanks to our Vice Chancellor, Professor Prabhat Ranjan, and Director, Professor Shashi Singh, for their moral guidance and constant support that inspired us to build the 3rd volume of SCINION's E-magazine. With this joyful event, we would also like to thank our faculty advisors of the School of Biosciences and Bioengineering for helping and guiding us tirelessly in making this E-Magazine a successful one. Last but not least, we would like to express our appreciation to every student who contributed their lovely submissions to make our E-magazine dream a reality. Thank you very much to everyone who is reading! We hope you will enjoy this journey of the E-magazine.

Regards,
Editorial Team

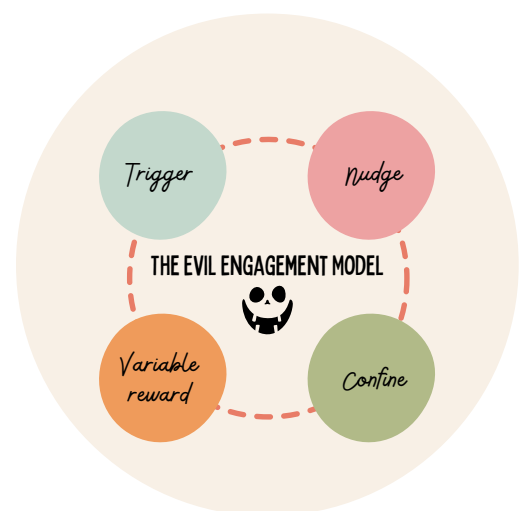
Editorial Statement

If only social media were not writing on the wall

Would you not agree that social media is the best thing since sliced bread? It has revolutionised lives, especially that of youths! People connect with strangers who go on to become their best friends or significant others, they stay connected while being wildly apart, physically, and they derive a sense of belonging. Young folks often find inspiration online—learn new things and discover their identities even! And, who wouldn't agree that some strangers out there help us deconvolute our unresolved emotions and doubts more than our most cherished people sometimes?

With something being so good, does it not pose any threats to our habits? Well, here are a few numbers to bring us to a dismal start: In 2020, over a billion people spent at least three hours a day on social media, primarily engaging in what is described as mindlessly scrolling through their newsfeeds. Why scroll so much? Much like a slot machine, social media feeds deliver a mix of mundane and exciting content, thus triggering a dopamine-fueled desire to keep scrolling in anticipation of the next piece of rewarding content. A respondent to a survey said, "It can keep you in an endless cycle of content that you can refresh whenever you don't like, leading to instant gratification. People can be bombarded with more information than they can possibly handle and might get used to the constant stimulation."

Besides, the "Fear Of Missing Out" (FOMO) plays a significant role in perpetuating one's scrolling addiction. You see, social media platforms are designed to create a sense of urgency and exclusivity. So, let's dive a little deeper into the very meticulously planned ruses of social media platforms that kindly assist us drown further into the ocean of their contents, shall we? Precisely, social media platform designers aim to build a practical framework that disables users from detaching from their platform's addictive features. A model of the said kind usually presents a circular 4-phase feedback loop that increases engagement: First, a trigger (e.g., a push notification) brings a user to the platform.



Second, once on the platform, users are nudged to perform actions (e.g., liking, posting, creating a friend list). Third, these actions become investments in the platform, which makes it harder to leave ("It took time to create my friend list"), they also act as triggers for other users ("somebody liked your post"), and they are used to populate the endless newsfeed of users. The newsfeed is one of the central design features in the fourth and last phase of the model, the variable reward phase, where users are rewarded continuously with new content to view, comment, share, or like. It leads to many users mindlessly scrolling through their newsfeeds. Many of these design features can be described as digital nudges, i.e., indirect incentives that drive user choices.

How about you try finding out what it takes to become an undefeatable social tycoon and understand how social media takes control of your life? Try a cool game here: social-tycoon.com

Studies are beginning to show links between smartphone usage and increased levels of anxiety, depression, and poor sleep quality. We now understand that the menacing design of social media platforms keeps us hooked to them, but what are the psychological underpinnings of these places that make them so addictive? The levers in our brains—dopamine and social reward systems are to be blamed. Dopamine is a chemical produced by our brains that plays a starring role in motivating behaviour. The dopamine pathways in our brains reinforce the association between a particular stimulus or sequence of behaviours and the feel-good reward that follows. Every time a response to a stimulus results in a reward, these associations become stronger through a process called long-term potentiation. This process strengthens frequently used connections between brain cells called neurons by increasing the intensity at which they respond to particular stimuli. And there, you've got an addiction on your hands! A respondent to our survey suggested that social media algorithms are trained well to tailor to a user's interests, but they can also flash content that will likely be strongly disliked or hated by a user to get them to interact negatively with it and want more to be able to raze their disapproved idea(s) to the ground. Now, you may think that even with all these big, bad hazards social media use presents, you're immune to all or most, so there's nothing to tear your hair out about. If that's the case, have you wondered whether your attention span is doing well? Turns out, the average goldfish has a longer attention span than humans! This drastic shift is mainly attributed to the constant influx of information and stimuli in the digital age.

Further, frequently switching between platforms and content trains the brain to be easily distracted and struggle with deep focus. Have you ever found yourself getting lost while reading something and forgetting to understand the contents? You might have. We multitask, scan and skim through information, but rarely indulge in deep processing and it's a shame. Does any of this ring a bell? If the answer is yes, you might be struggling with retaining attention while performing tasks.

In the time of the digital age, it is incredibly easy to lose yourself in the constant stream of notifications and endless scrolling. Our devices seem to have a magical hold on us, holding us in with each like, swipe, and tap. Have you ever caught yourself closing an app and involuntarily opening it again? It's like our devices have become an extension of ourselves that guides our actions instinctively and we cannot seem to get rid of them easily.

But, amidst the hustle and bustle, it's important to pause, take a breather and think about how this continuous connectivity affects us. Our attention span has been deteriorating day by day, overwhelmed by the onslaught of the unlimited information bombarding our minds. And, the emotional rollercoaster of social media taking you on a journey from exhilaration to self-doubt in a heartbeat.

However, inside this chaos lies an opportunity to clear your mind by taking yourself on a growth spree and self-discovery. It's all about finding that delicate string of balance between staying connected and when to disconnect. Setting boundaries isn't always easy, but it sure is important for maintaining sanity in a world that never sleeps. And mindfulness? It's our secret weapon against this mindless scrolling, holding us in the present amidst the digital noise. And, let us not forget the magical land of real-world connections, the richness of face-to-face interactions that no amount of online engagement can match.



Whether it's enjoying moments with our loved ones or indulging ourselves in our favourite hobbies and cherishing the things we're passionate about. No offline experience can nourish our soul like these offline experiences do.

So, while social media has its ups and downs, it also holds the power to connect, inspire and drive positive changes. By reclaiming our attention and embracing a mindful approach to technology, we can navigate this brave new world with resilience and grace.

In conclusion, it's not about escaping the digital world but rather about finding our place within it—a place where technology helps rather than diminishes our lives. It's a journey of self-discovery and empowerment, guided by intentionality and a deep-rooted connection to what truly matters. And in this ever-evolving digital landscape, may we find balance, purpose, and a sense of fulfilment that transcends the virtual realm.

We would like to express our sincerest gratitude to the survey participants, Shreyas Raghuram, Krishna, Lisa Fernandes, and Aditi Danve for their valuable opinions, thoughts, and contributions to the addressed subject and the editorial.

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Vice Chancellor's Desk



"I have always believed in scientific research and development to make an impact on society and the nation. But all of this fails to reach the larger masses for impact if it is not communicated well in the language of common people. With this in mind, I started writing blogs and also participated in starting a YouTube Channel "Science Wience".

During the development of Technology Vision 2035 also I had strongly emphasized on using different forms of communication to reach out to both the policy-makers and the public at large. I am glad to see that the students of DYPIU have also begun to communicate the nitty-gritty of science and technology using different forms of communication. I am deeply elated to see the varied subjects that Scinion has covered this time. It is wonderful to see that all of this work has been done by the young blood of DYPIU and I am proud to see how fast Scinion has moved ahead in only three years.

DYPIU is focused on the digital future from day one. Like all forms of communication, Science communication is also impacted by the use of technology. I am confident that Scinion would explore newer developments in technology to reach out to the masses and be instrumental in helping science break its shackles and reach out to all stakeholders."

Prof. Prabhat Ranjan

Dean's Desk



"I am privileged to get a peek into the world of Scinion before it gets out, what a delight it is! Creativity at its peak! Putting science in simpler words is no game, putting science in toons and illustrations is another level of craft, and here our students DO it with elan. Captivating, unputtable down third issue of Scinion with many topics of interest. Trust me it is not the science you will like to shirk away from, it is the science presented in a way you had like to know and prompt you to say—what next? Storytelling a serious scientific concept has caught my lingering fancy, hope I can put it to practice to serve you things so simply. A big applause to the team. Thanks for teaching me!"

Prof. Shashi Singh

Mentor's Desk

A symphony of life

In the heart of the cell, where love unfurls,
Actin and Myosin, in a dance of swirls.
Myosin, a motor, with strength untold,
Jealous of Actin, in the story to be told.

Oh, Myosin, with passion strong,
Watches Actin, as it moves along.
Pulling on filaments, with energy's might,
A lover's dance, in the cellular night.

Actin whispers, in a tender plea,
"I interact for the cell, can't you see?
These bonds I form, with proteins so dear,
Keep the cell alive, banish every fear."

Myosin, eyes narrowed, with love's desire,
Yet, doubts arise, a burning fire.
"Why with others, must you entwine?
In this dance of life, our love should shine."

Actin, gentle, in response does say,
"Each interaction, in its own way,
Serves the cell, our common goal,
To keep it thriving, is our lover's role."

In the microcosm of a cellular affair,
Actin and Myosin, a union rare.
For every pull, and every embrace,
A symphony of life, in this sacred space.

So let love guide, in the cellular ballet,
Actin and Myosin, in their unique display.
A dance of purpose, a love profound,
In the cellular realm, forever bound.

Dr. Surabhi Sonam



MEET THE TEAM





SAKSHI
EDITOR



SANJANA
DESIGNER



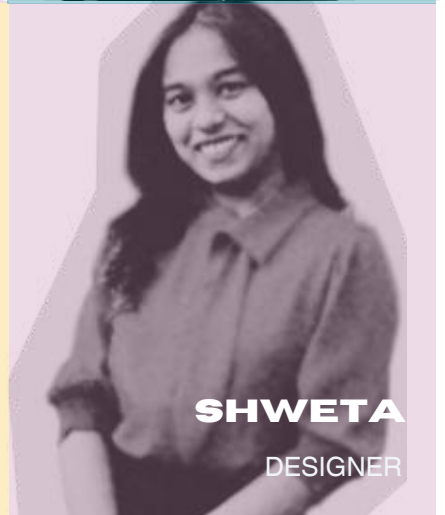
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RIDDHI
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HEMA
DESIGNER



SHWETA
DESIGNER



ADITI
DESIGNER



PRATIKSHA
DESIGNER,
SOCIAL MEDIA MANAGER



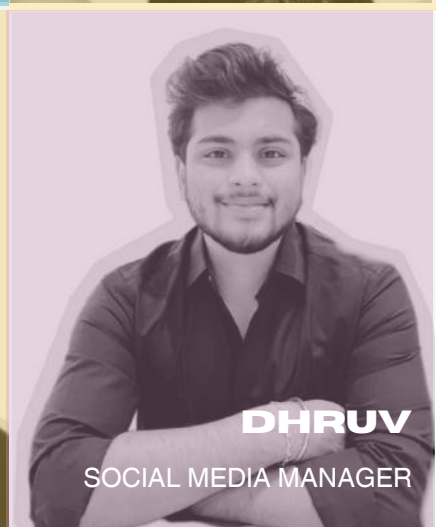
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JOSHUA
SOCIAL MEDIA MANAGER



AYUSH
SOCIAL MEDIA MANAGER



DHRUV
SOCIAL MEDIA MANAGER

TECH

TRIUMPHS

AT

INDUS FIESTA

2024

Knackers

Interviewer - Suzanne Mondal

Mahesh Baliram Khannukar

MCA, first-year

Winner of Knackers Competition

"In a group discussion, it is important to communicate — when you speak in a loud voice, that is when everyone can hear and understand what your point is."



Terrarium

Interviewer - Dhvani Panchal

Sanjana Chavan

BTech Bioengineering, third-year

Winner of Biocraft, Cellular Culinary, Biosynth, Biogenesis Competition

"... when I actually got into the field and explored a lot of things, it got me curious about how things actually worked..."



Breaking Barriers: The Transgender Struggle

Interviewer - Suzanne Mondal

Sourabhi Yadav

BA JMC, first-year

Winner of project competition

"... we studied a lot about transgenders and I have seen (it) myself - in my area, there are societies for transgenders. These factors prompted me to bring that point in."



Innointeract MASTERPIECES

Ekko - Music Player of the future

Interviewer - Suzanne Mondal

Ashwajeet Singh and **Nisha Sharma**, students of the BCA class of 2023 speak about their experience developing their music-streaming mobile application, Ekko.

"If you want an output, you have to put in some or the other input every day."

"... the time constraint is always there, but YOU have to decide what you want in life and what you want to pursue..."



AndroidIDE

Interviewer - Keshwam Pandey

Akash Yadav takes you on a journey of how a dream of development in the palm of your hands came to reality.



"Well now you don't need a whole setup to start your coding journey, just have your phone and a passion of coding and you're good to go."

The Impact of Social Media on Skin Care

Interviewer - Lisa Fernandes

Muskan Joshi, a fifth year medical student at Tblisi State Medical University with a passion for research. In July, 2022, she published a review article titled "The Impact of Social Media on Skin Care: A Narrative Review". She shares her thoughts on the dependence and trends on social media for skincare, its shortcomings, and how to tackle the world of research as an undergrad.

"I will get a hundred thousand searches on how to reduce acne, how do I as a thirteen year old who does not even know what she wants for dinner know what regimen will work for me?"



Innointeract MASTERPIECES

AutoEDA

Interviewer – Riddhi Kulkarni

Devang Chavan's project simplifies the initial steps of data analysis, traditionally taking 2-3 hours per dataset, by automating it. It provides quick and accurate data profiling, statistics, and visuals, enabling analysts to focus more on advanced analytics and decision-making.

"... nothing free is available online, and those are very complicated and more focused towards experts who know how to use a particular software. For normal people who just want to casually analyze a dataset, this is the only tool..."



Showcasing the working of the normal and healthy knee and ACL injured knee

Interviewer – Riya Bhosale

Jaya Kothari is aiming to showcase & understand the biomechanics of a healthy knee vs an injury of ACL to aid in their treatment strategies & rehabilitation protocols using a 3D model.



Quantile AI

Interviewer – Dhvani Panchal

Isha Syed, Aryan Purohit and Yash Malusare are creating a product that will make LLMs more accessible worldwide. They are optimizing prompts and everything around it, aiming to combine services from different companies into one platform, accessible to each of us through a single key.

They were conducting research with a German-based company when they realized there was a market need. Through this realization, they decided to work on the project.



Innointeract SHOWCASES

DYNAMIC RC PLANE

Dhruva Yandrapu, Tarangana Gokhare, Priyanshu, Aryan Sarakniya, Renuka Khare
Course, year: BTech CSE, second year

Description:

The RC plane possesses numerous capabilities and is a serious outdoor machine with extreme flight control and dynamics.



THE ONYO PROGRAMMING LANGUAGE

Priyanshu Dangare
Course, year: BTech CSE, second year

Description:

An interpreted, dynamically typed, automatic memory-managed programming language - Onyo was designed to have a simple implementation while maintaining the user-friendliness of dynamic programming languages such as Python, JavaScript and Ruby.

Source code and more information at github.com/aspizu/onyo

AUTOMATIC PET FEEDING MACHINE

Darshan Varude, Gujan Patil, Abhijit Aher, Aayush Gonpalliwar
Course, year: BTech CSE, second year

Description:

The pet feeder enables precise portion control, reducing the risk of overfeeding or underfeeding pets and promotes healthier feeding habits.



Crystal Alchemy: Discovering the Magic of Gemstone Therapy.

-By Gauri Dherange



Introduction

Gemstones, any of various minerals highly valued for their beauty, durability, and rarity, have long captivated humans. People are drawn to the vibrant colours with sparkling lustre and mysterious properties. The scarcity of gemstones contributes to their high value. Stones, which are formed of minerals found in the earth's crust, have a profound impact on the wearer due to their unique chemical composition and crystal structures. The majority of gems are minerals, but some, most notably **pearl** and **amber**, are organic.

The study of gemology focuses primarily on hardness, crystal shape, gravity, and optical properties. Specific gravity refers to the density or weight of the stone, whereas optical properties aid in differentiating the methods of cutting and polishing the crystal. Gemologists use the Moh's scale to determine hardness, with diamonds scoring the highest.

How do gemstones function :

When exposed to UV or x-rays, gems emit visible light because defects in the crystal structure absorb the radiation, causing their constituent electrons to vibrate between energy levels and release the energy as light.

Cosmic energy is the external spiritual energy and vital source that animates all forms of life. Modern scientists have attempted to investigate the effect of celestial bodies' emitted cosmic energy on gemstones. When crystals absorb these energies via colour-coded frequencies, they seep into your body and heal the problems in your life.

That is why astrologers advise you to wear these birthstones so that they come into contact with your skin. This allows cosmic rays to enter your body and have an impact. Though no concrete scientific studies have been conducted to prove the efficacy of crystal healing, research suggests that this therapy may induce a placebo effect in people. Placebo effects are those of a treatment that are not directly related to the therapy but rather to the patient's responses. As a result, they conclude that a person may feel better after receiving crystal healing.

Colour therapy for crystal healing

Colours have an effect on the human body, according to modern science. Green, red, blue, purple, and other colours can emit rays that control your body's behaviour and responses. This advantage stems from the fact that the sun is the source of all energy associated with colour and lustre. Gems respond positively to light because they possess both of these characteristics.

The wavelength of coloured light emitted by the planets corresponds to the wavelength of radiation emitted by their corresponding gemstones.

Through a prism, the sun's rays will reflect a seven-colour spectrum, with two invisible colours: ultraviolet and infrared. Together, the nine colours form the cosmic matrix that is the essence of our solar system.

Each colour has its own specific characteristics and unique impact on your life. Below are the main precious stones (image credits: iStock).

Green Emerald

It signifies nature and brings relaxation to your body. It balances your inner energies and benefits your heart, circulation and lungs.



Blue Sapphire

It is the deepest color of spectrum which signifies relaxation, calmness and contentment. It helps in curing sleep disorders, headaches and mental acuity.



Yellow Sapphire

It represents shining sun and bright light. It stands for ambition, wisdom and confidence. The energy of this color improves digestion, remove tiredness and helps to cure skin problems.



Conclusion

Crystals have been used by priests and ancient forms of medicine to align the body's chakras. And now, the use of crystals as an effective form of self-care is becoming extremely popular. Gemstones' healing properties are thought to interact with the body and promote physical, emotional, and spiritual healing. They are frequently approached from a holistic standpoint, taking into account the interconnectedness of the mind, body, and spirit. Although scientific research on crystal healing is limited, the placebo effect may play a role in perceived benefits.

Red Ruby

The color red of stone brings warmth, comfort and love. This gemstone can enhance metabolism, improve blood pressure and increase respiration rate.

Finally, the healing properties of gemstones are highly personal and subjective and can differ from one person to the next.

So, this whole thing was about crystal healing. Do let me know if this was informative enough to satisfy your curiosity about gemstones.

GUT GAZETTE: THE DIGESTIVE DELIGHTS AND BRAINY INSIGHTS

DO BRAIN CELLS HAVE A
CONNECTION WITH OUR GUT?

-By Juhi Landge



The human intestine is lined with more than 100 million nerve cells — it's actually its own brain. And in fact, the gut speaks to the brain and releases hormones into the bloodstream. This tells us how hungry we were or why we shouldn't have eaten the whole pizza in about 10 minutes. However, new research shows that the intestines are directly connected to the brain via neural circuits and can send signals in just a few seconds.

The gut is an important organ for digestive and immunomodulatory functions that consistently accommodates the microbiome ecosystem. The gut microbiota works in concert with the host to regulate the development and function of the immune, metabolic, and nervous systems. It can affect the progression of diseases of extraintestinal organs such as the gut and brain.

The intestine is intimately connected to the central nervous system through dynamic two-way communication along the gut membrane axis.

The connection between the intestinal environment and the brain can affect behavioural factors in the host. The disruption of microbial communities is associated with several neuropathies. The brain-gut axis has been the subject of research over the past several years.

The intercommunication between the brain and gut occurs through multiple biological networks, including neural networks, the neuroendocrine system, the immune system, and metabolic pathways that enable bidirectional communication. In addition, changes in gut microbes can affect brain physiology and cognitive-behavioural function. The gut microbiota is required for the normal development of both the intestinal and peripheral immune systems. For example, the gut microbiota affects microglia, the innate immune cells of the brain.

Microglia, which are affected by the intestinal flora, can affect processes such as stress, human behaviour, and neuropathy. Cytokines produced in the intestine can travel through the bloodstream to the brain and affect the systemic immune system. Changes in systemic immunity alter immune signalling and peripheral brain inflammation associated with many neuropsychiatric disorders, including anxiety, depression, and autism spectrum disorders.



Although the chances of crossing the blood-brain barrier (BBB) are small, signals can be relayed to the brain via the BBB. The gut microbiota influences the permeability of the blood-brain barrier.

IMPACT OF GUT BARRIER IN BRAIN DISEASE :

Symbiosis between the gut microbiota and its host affects various neural functions through dynamic intestinal and brain communication. These processes can affect human health and behaviour in some cases of neuropathy. Here, we discuss possible new evidence and possible contributions of the gut plexus to host mood and neurological disorders such as stroke. Stroke leads to inflammation and an immune response in the brain and immune system. The intestine, or gastrointestinal tract (GI), is an important immune organ with the largest pool of immune cells, accounting for more than 70% of the total immune system,

and the largest population of macrophages in the human body.

BIDIRECTIONAL COMMUNICATION— BRAIN AND GUT AFTER STROKE :

Two-way communication between the brain and intestine is commonly referred to as the “brain-gut axis” or “gut-brain axis.” Recent evidence suggests that gut inflammatory and immune responses play an important role in the pathophysiology of stroke and may be important therapeutic targets for its treatment.

Bidirectional communication between the intestine and the brain after stroke involves the vagus nerve, damage-associated molecular pattern (DAMP), and cytokine release from the brain injury site, as well as intestinal inflammatory or immune cell migration to the brain injury. Stroke patients associated with GI complications often have poor outcomes, with increased mortality rates and deteriorating neurologic function.

RECENT ADVANCES :

In recent years, scientists have made several exciting discoveries to understand how gut microbiota hear and regulate brain-gut communication, in some pathologies.

To understand the complexity of bacteria, the development of metagenomics technology is very helpful in sequencing microbial nucleic acids without the use of bacterial cultures. The gut microbiota can affect the degree of post-stroke inflammation through its ability to release neuroactive molecules and regulate intestinal T cell transport to the meninges.



CONCLUDING REMARKS :

Brain axis dysfunction is a promising area of research for identifying new mechanisms, prevention strategies, and therapeutic strategies for stroke. The Cerebro intestinal axis is an important network that communicates through a variety of pathways, such as the vagus nerve and ENS (Enteric nervous system). The novel transgenic model is useful for identifying the origin, role, and fate of immune cells that migrate to the intestine and, thus, for the development of novel therapies targeting inflammatory and immune cells in the treatment of stroke.



ARTISTIC VIEW TOWARDS SCIENCE: DNA ORIGAMI

-By Anagha Pande

Do you understand what origami is? It is the Japanese art of folding paper into decorative shapes and figures. But what if an origami is formed using DNA? Isn't it fun to make a nanoparticle out of origami in a variety of shapes?

DNA is known as a carrier of genetic information in living organisms. The DNA double helix is flexible. It can be twisted, bent, and stretched to form complex 3D structures. "Scientists have realized that they have the potential to be designed, to create different shapes", said Professor Alvin Romansky a prominent figure of Biochemistry and Molecular Biology at Baylor College of Medicine.

Because DNA is paired in a predictable way, it can be assembled into specific shapes by skillfully designing the sequences of multiple strands of DNA.

The images shown are composed of DNA, a molecule that provides genetic instructions for making an organism. This demonstrates the latest capabilities of a technique called DNA origami, which allows DNA to be precisely twisted and folded into complex assemblies for use in future biomedical applications.



DNA origami is a bioengineering layout of biomaterials that could have sensible applications.

The basic idea of DNA origami is to take advantage of the basic properties of DNA (correct pairing of building blocks, four DNA bases, etc.) to design structures that are much smaller than the smallest cells. So far, these nanostructures have resulted in a limited range of shapes. By improving the strategy for folding DNA, Hao Yan and Yan Liu of the Arizona State University, Bio design Institute have created much more complex and diverse designs based on computer drawings.

The first DNA origami was designed by hand, and the technique was limited to a small group of experts in this field. To expand the availability of DNA origami, scientists have developed algorithms that automatically create DNA devices. To create the new shape, researchers first used a computer program to sketch the overall silhouette of the DNA origami structure and calculate the trajectory of the DNA molecule.

Then, in a small test tube, a long piece of DNA was mixed with a short piece. This helped to bend and stabilize long pieces along computer-generated paths. The final results captured by various diagnostic imaging methods showed that the structure resembled the designed pattern.

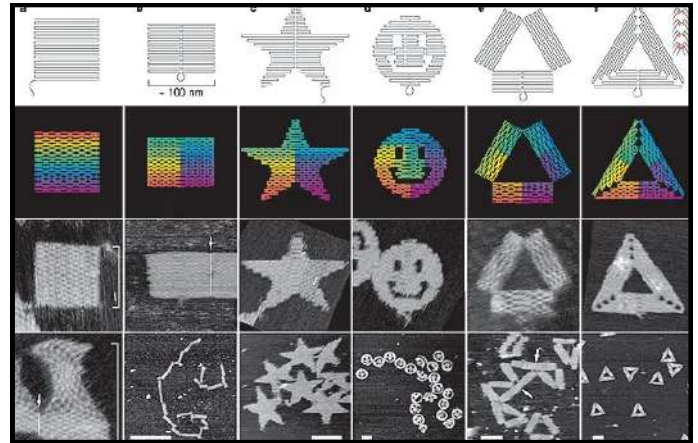


Photo credit: [Nature](#)

The shape formed by the DNA origami can be seen in amazing detail under a microscope. Besides looking very cool under a microscope, this DNA origami has many uses.

It has been used to build nanorobots and other structures for fluorescence, enzyme-substrate interactions, molecular motor action, various light and other energy studies, and drug delivery studies. DNA origami is widely applied through the means of biosensors, computational structures, positioning scaffolds, and drug delivery.

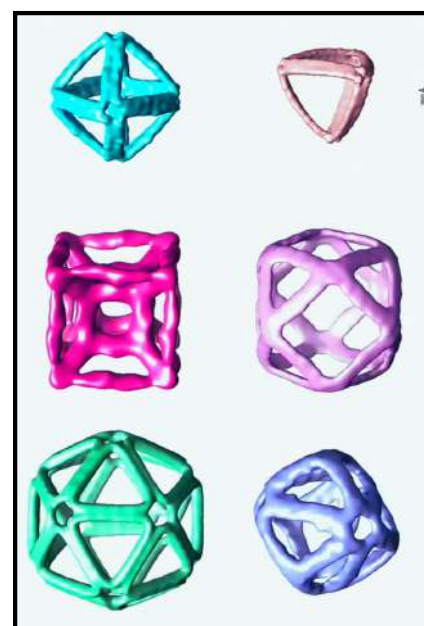


Photo credit: [Baylor College of Medicine](#)

Computational Structures :

In 1994, Leonard Adleman first showed that computational problems, especially the Hamiltonian path or travelling salesman problem, can be used to solve computer-based problems.

Positioning Scaffolds :

Another potential use of DNA origami is to not use the DNA itself as a building material, but as a positioning scaffold for assembling other structures. This idea is being considered to allow self-organization of electronic circuits.

Drug Delivery :

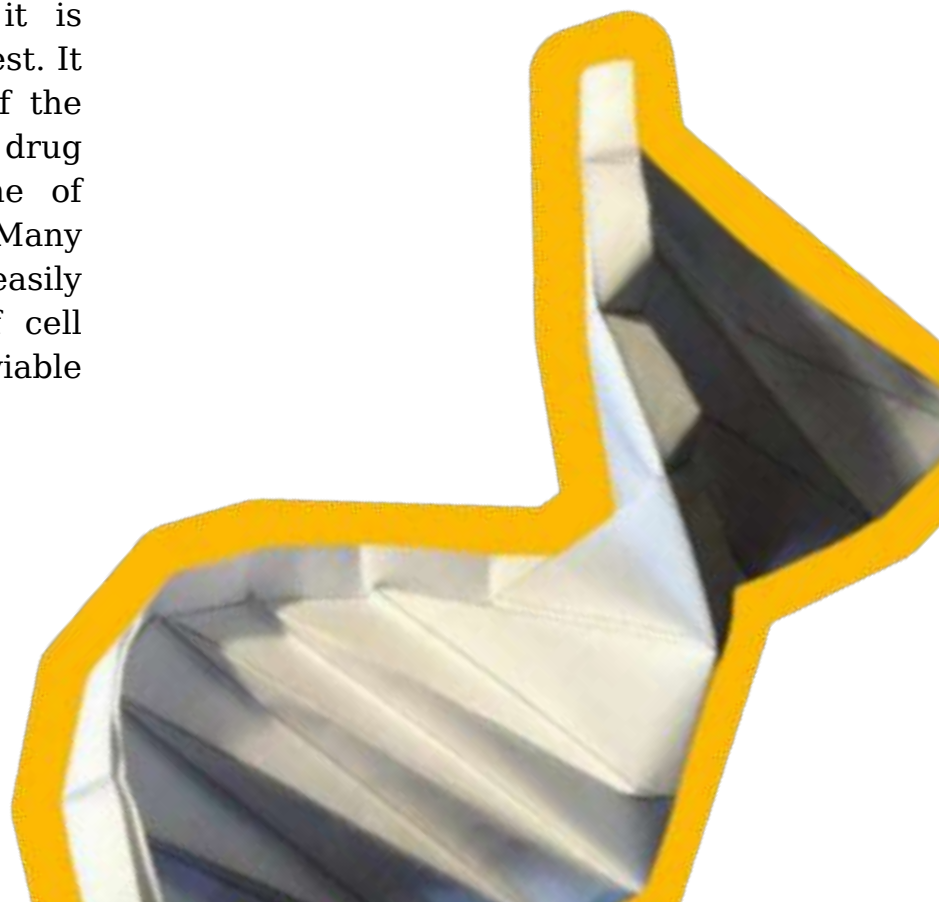
Drug delivery is one of the most promising therapeutic uses for DNA origami. The drug can be wrapped in an origami structure before it is internalized in the cells of interest. It can then open the structure of the DNA origami and release the drug molecule into the cell by one of several available mechanisms. Many DNA origami structures are easily incorporated into a variety of cell types, suggesting that this is a viable drug delivery strategy.

Biosensors :

A potentially more manageable, short-term application of active DNA origami structures is as a biosensor. In some incarnations of this idea, perceived molecular binding causes conformational changes in the DNA origami structure, resulting in measurable output, increased fluorescence or electrical signal.

Conclusion :

In the future, DNA origami will have wide applications as increasingly complex structures are released each year. Technology seems to be moving into an era where structure is increasingly limited only by human imagination.



Swarms of *Black* *Holes at* *the Milky* *Way's* *Heart?* Maybe Not

-By Atharva Mule

Revisiting a controversial claim, astronomers are laying bare deep uncertainties about our understanding of galactic centers.

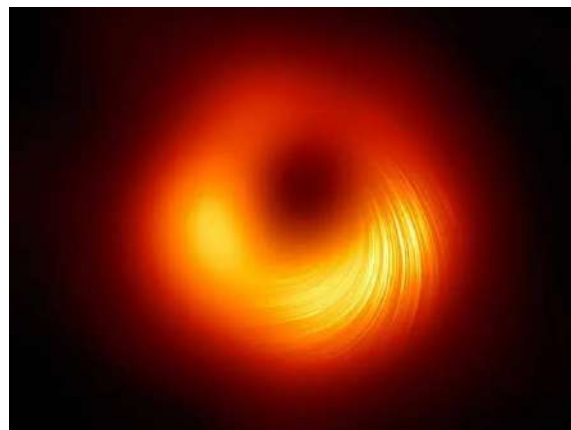
What is a Black Hole?

A black hole is a place in space where gravity pulls so much that even light cannot get out. The gravity is so strong because matter has been squeezed into a tiny space. This can happen when a star is dying.

“Four years ago, Chuck Hailey, an astrophysicist at Columbia University, published a paper in *Nature* in which he and his co-authors argued that they had at last spied the Milky Way’s hidden swarm of black holes—or rather, the swarm’s most flamboyant members. If some of those black holes were binaries—meaning they orbited alongside another object, usually a star—they should syphon off material from such companions that, in the process, would heat up and emit detectable x-rays. Using more than a decade of archival data from NASA’s Chandra X-Ray Observatory, Hailey and his colleagues found a dozen previously unknown sources of x-ray emission in the vicinity of the Milky Way’s core—each of which, they say, likely represents a black hole feasting on a star. Collectively, the dozen candidates would thus betray the presence of a population of thousands upon thousands of unseen, quieter kin.

The star cluster in question is called Palomar 5, located around 80,000 light-years away. Such globular clusters are often considered 'fossils' of the early universe. They're very dense and spherical, typically containing roughly 100,000 to 1 million very old stars; some, like NGC 6397, are nearly as old as the universe itself. In any globular cluster, all its stars are formed at the same time from the same cloud of gas. The Milky Way has around 150 known globular clusters; these objects are excellent tools for studying, for example, the history of the universe or the dark matter content of the galaxies they orbit. But there's another type of star group that is gaining more attention: tidal streams, long rivers of stars that stretch across the sky. Previously, these had been difficult to identify, but with the Gaia space observatory working to map the Milky Way with high precision in three dimensions, more of these streams have been brought to light.

'We do not know how these streams form, but one idea is that they are disrupted star clusters' explained astrophysicist Mark Gieles of the University of Barcelona in Spain.



This is by far the clearest image of a black hole.



Diving into the Ooho Ocean

A Unique Solution To Plastic Pollution, The Ooho—Edible Water Bubble!

-By R. K. Hemadurga

Most people have realized that the health of the ocean is also our health. Many attempts have been made to address the ever-increasing problem, as we continue to dump almost 8 million tons of plastic into the ocean every year.

Have you ever wondered about an alternative to plastic water bottles? We're entering a post-plastic world where the edible water bubble—The Ooho provides a unique solution to plastic pollution.

Talking about the detrimental nature of plastic bottles, they are made up of synthetic polymers that are considered to be harmful to the environment. These sealed plastic bottles not only take a long time to decompose, but they're also difficult to recycle.

Each year, about 50 billion single-use plastic water bottles made of polyethylene terephthalate (PET) are produced in various nations, the majority of which are discarded. PET is resistant to breaking down after its life span is complete due to its stability and durability. Because of these features, it is considered a useful packaging material. PET is largely non-biodegradable, with plastic bottles taking up to 450 years to degrade.

Luckily, there is a solution to this problem; an alternative to plastic bottles, the edible water bubble-Ooho. It is a droplet-like water container made of sodium alginate gel. The biodegradable structure was created by a small team of entrepreneurs from the Skipping Rocks Lab at Imperial College, London in 2013, in an attempt to make a more environment-friendly alternative to one-time-serving plastic bottles. It is a spherical water droplet wrapped in a thin, tasteless, and edible membrane.

It's also possible to incorporate tastes and other consumables into it. The concept derives from the packing of edible liquids, where potential fluids such as ice have been undergoing so-called spherification for a long time now. So, to create the membrane, an ice ball is placed in a mixture of brown algae and calcium chloride. The sphere fills up with water or any other suitable liquid once the inner ice begins to melt.



Alginate gels' biocompatibility has been fully examined, and their safety for consumption has been established. Human enzymes are unable to break down natural polysaccharides. However, the Ooho capsule will gradually degrade as the calcium diffuses from the gel matrix, even if it is undigested when eaten. Since it is alginate, it can be broken down into smaller components by a range of chemical processes. It can be broken by both acidic and alkaline reactions. Many bacterial species contain an enzyme called alginate lyase, which may break down the molecule into mono-sugar components and provide energy to the cell.



If not consumed, it biodegrades in just 4–6 weeks.

The manufacturing of Ooho is being developed into a completely automated machine, and in the meantime, it is only sold on special occasions. Nonetheless, this inventive alternative to plastic bottles provides a low-cost, environmentally beneficial method of carrying water and other liquids.

Generally, a marathon's aftermath is a sea of plastic trash. In an effort to make the event more sustainable, the London Marathon Events (LME) replaced millions of plastic water bottles with edible seaweed capsules in 2019. This was the largest-ever trial of the Ooho pods.

Although there are some obvious drawbacks such as the limited shelf life and fragile nature of Ooho making it unable to carry it casually or pack it into a carry-on bag while travelling and just offers a single gulp of water to the user. Addressing these concerns with targeted research can help people embrace the product.

In fact, widespread acceptance of Ooho will dramatically reduce harmful emissions of plastics while also contributing to sustainable development. Let's hope that this innovative alternative helps to reduce plastic waste!



THE SCIENCE BEHIND THE FEAR OF THE IRRATIONAL

Phobias are not just fancy terms for unreal things. Here's why.

-By Ritwika Sen

This is it. You are going to die. You cannot run, you cannot scream, you. . . cannot. . . think. Your brain is going to shut down any minute now. Your limbs feel weak, your throat is running dry. Your heart is going to be in your hands any minute now. If only. . . you could move away. If you could only start moving, this thing in front of you wouldn't be so much of a problem.

It's your worst nightmare, the bane of your existence. It's a clown, of all things. As I write this, I have a picture of a circus pulled up on a tab on my computer screen. This has all been to make this process more authentic but the only things I can feel right now are immense fear and trepidation. It's not just clowns, I am terrified to death of reptiles, insects, thunder, large bodies of water, heights, blood, you name it.



This fear that takes over my mind has fascinated me for the longest time.

I've found myself wondering: What is it about these seemingly ordinary things that make my throat go dry? So, I decided to do what any rational person would do: Google it.

The results are fascinating. The American Psychological Association defines a phobia as a persistent and irrational fear of a specific situation, object, or activity (e.g., heights, dogs, water, blood, driving, flying), which is consequently either strenuously avoided or endured with marked distress. Note the use of irrational. Phobias are often fears that have no basis; some people are afraid of the colour yellow! It is called Xanthophobia and is a very real thing.

Furthermore, according to the National Institute of Mental Health, over ten million adults suffer from some kind of phobia in the United States alone. This is an alarming number for one of the most heavily populated countries in the world. Where is this fear response being generated in the brain? Why is it happening in the first place?

New York University psychologist Joseph LeDoux, PhD, is a pioneer of this type of research. He brought together a team who worked on laboratory mice and subjected them to electric shocks accompanied by a neutral stimulus, like particular tones of sounds. This generated fear in the mice, which was then dissipated by stopping the electric shocks during the neutral stimuli.

Over the course of this experiment, LeDoux and his team found out that this fear is generated in the amygdala, a pair of almond-shaped regions in the brain that governs emotions like — you guessed it — fear. They concluded that there are two pathways leading to the amygdala for the fear response. The first pathway is fast but imprecise. It is caused by a terrifying sensory stimulus, like the smell of blood or the sound of thunder. The second pathway is slower but it reaches the higher cortex, the rational part of the brain.

LeDoux explains, "If a bomb goes off, you might not quickly be able to evaluate any of the perceptual qualities of the sound, but the intensity is enough to trigger the amygdala. If you knew a lot about bombs, then through the cortex pathway you could evaluate the danger, but it will take longer."



Photo credit: Pinterest

THE SCIENCE BEHIND DREAMING

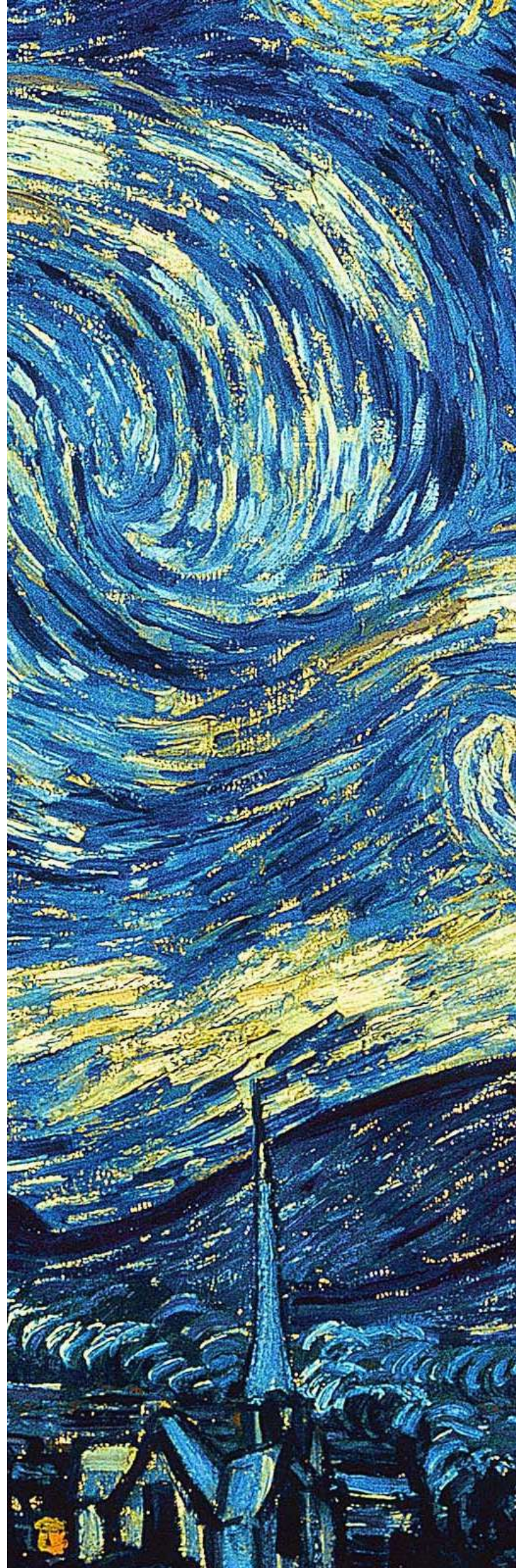
-By Tanvi Khanvilkar

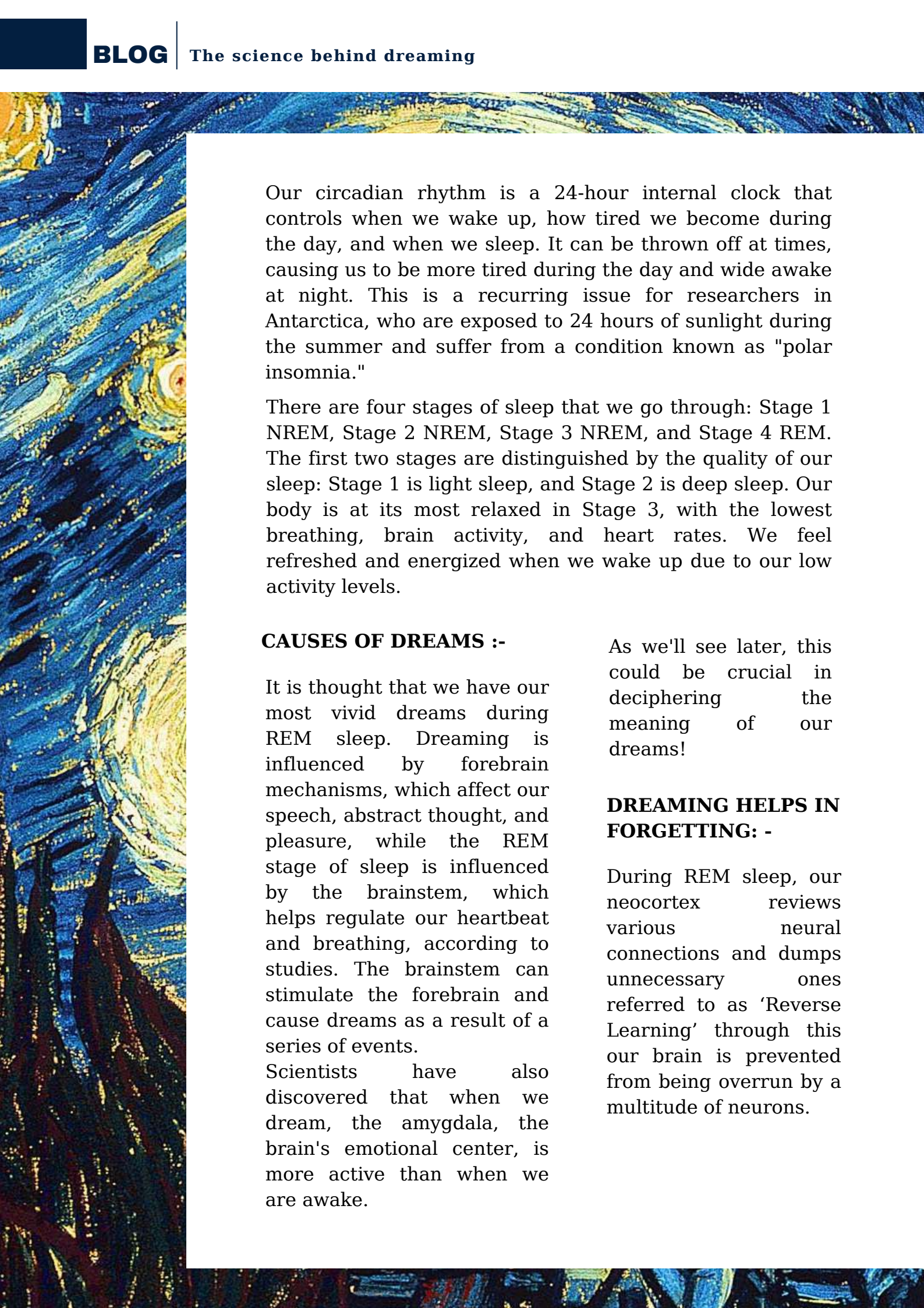
The *ACTIVATION SYNTHESIS MODEL* says that dreams are actually random. They are our brains' way of making sense of activity that goes on while we sleep. Our brains take signals from parts like the amygdala and the hippocampus and try to interpret them, resulting in dreams.

Have you ever wondered if our dreams really mean anything, why we have them, or if they benefit us in some way?

CAUSES OF SLEEP:-

To comprehend our sleep cycle, we must first consider the rising and setting times of the sun! When the sun sets and natural light fades, our bodies produce melatonin, a hormone that assists us in falling asleep. When the sun rises and the amount of natural light increases, our bodies produce more cortisol, which helps boost and balance our energy levels. This pattern of the rising and setting sun, taken together, aids in maintaining our sleep cycle, known as the circadian rhythm.





Our circadian rhythm is a 24-hour internal clock that controls when we wake up, how tired we become during the day, and when we sleep. It can be thrown off at times, causing us to be more tired during the day and wide awake at night. This is a recurring issue for researchers in Antarctica, who are exposed to 24 hours of sunlight during the summer and suffer from a condition known as "polar insomnia."

There are four stages of sleep that we go through: Stage 1 NREM, Stage 2 NREM, Stage 3 NREM, and Stage 4 REM. The first two stages are distinguished by the quality of our sleep: Stage 1 is light sleep, and Stage 2 is deep sleep. Our body is at its most relaxed in Stage 3, with the lowest breathing, brain activity, and heart rates. We feel refreshed and energized when we wake up due to our low activity levels.

CAUSES OF DREAMS :-

It is thought that we have our most vivid dreams during REM sleep. Dreaming is influenced by forebrain mechanisms, which affect our speech, abstract thought, and pleasure, while the REM stage of sleep is influenced by the brainstem, which helps regulate our heartbeat and breathing, according to studies. The brainstem can stimulate the forebrain and cause dreams as a result of a series of events.

Scientists have also discovered that when we dream, the amygdala, the brain's emotional center, is more active than when we are awake.

As we'll see later, this could be crucial in deciphering the meaning of our dreams!

DREAMING HELPS IN FORGETTING: -

During REM sleep, our neocortex reviews various neural connections and dumps unnecessary ones referred to as 'Reverse Learning' through this our brain is prevented from being overrun by a multitude of neurons.

Pandemics Unmasked

*The Black Death,
Influenza, COVID-19.*

*HOW DID HUMANS EVEN
MAKE IT THIS FAR?*

-By Chinmayee Kulkarni

Although, we've heard the phrase "unprecedented times" a thousand times over since the start of the COVID-19 pandemic, shouted through every media megaphone so that it sickens me to even type it, pandemics are far from unprecedented. In fact, pandemics and diseases have been around since the time humans have been around.

(Image credit: Spanish Flu: BBC;
COVID-19: The New York Times)



The Black Death

The Black Death also known, perhaps, less dramatically as The Bubonic Plague is caused by the flea-borne bacteria *Yersinia pestis*. The bacteria infect the fleas when they bite already infected rodents. They then multiply and block the fleas' alimentary canals. The fleas regurgitate these bacteria while biting other rodents, thus, spreading the disease.

There are three forms through which the plague manifests itself: The Bubonic Plague: the most common yet the least fatal, Septicaemic Plague: the rarest but the most fatal as it infects the bloodstream and shuts down organ systems quickly and efficiently, and the third; The Pneumonic Plague: which spreads through respiratory droplets and affects the lungs.

How in the world did we survive "The Black Death"?

There were no effective protocols for the plague in the fourteenth century. The medicinal knowledge was quite primitive and based on 4th Century Greek theories such as The Theory of Humours. Doctors believed that the plague was spread through "miasma" or bad air. Standard medical procedures such as blood-letting and various concoctions were given to the patients to no avail whatsoever. The Plague caused millions of deaths around the globe.

However, soon, port cities such as Venice established protocols for isolation, quarantine and travel restrictions. A slew of sanitary cordons of armed guards was placed on transit roads and the access points of cities to prevent the entry of people from known infected areas. Other port cities closed themselves to ships coming from these plague-infested areas.



Isolation and quarantine were the most effective treatments at the time and were used generously. A 40-day quarantine was imposed on all crew members of ships and other on-foot traffic. The cargo of the ship was also brought to designated buildings and a procedure called “purgation” that included continuous ventilation of materials was carried out. Wool, yarn, cloth, wigs and blankets were considered the most contagious of materials. Waxes and sponges were immersed in running water for 48 hours.

Permanent plague hospitals called “Lazarettos” were established for people showing plague symptoms.

They were located far from centres of habitation while also being close enough to transport the sick. They were often also isolated by natural barriers such as a river or sea, or even artificial barriers such as moats or ditches.

Through the implementation of these measures and the acquisition of herd immunity, The Black Death was finally overcome in the year 1353. It lasted for eight years and remains the most fatal pandemic ever recorded in human history till date.



Lazaretto Nuovo, Venice was used to quarantine and isolate plague victims. (Image credit: Roberto Rinaldi, naturepl.com)

Influenza

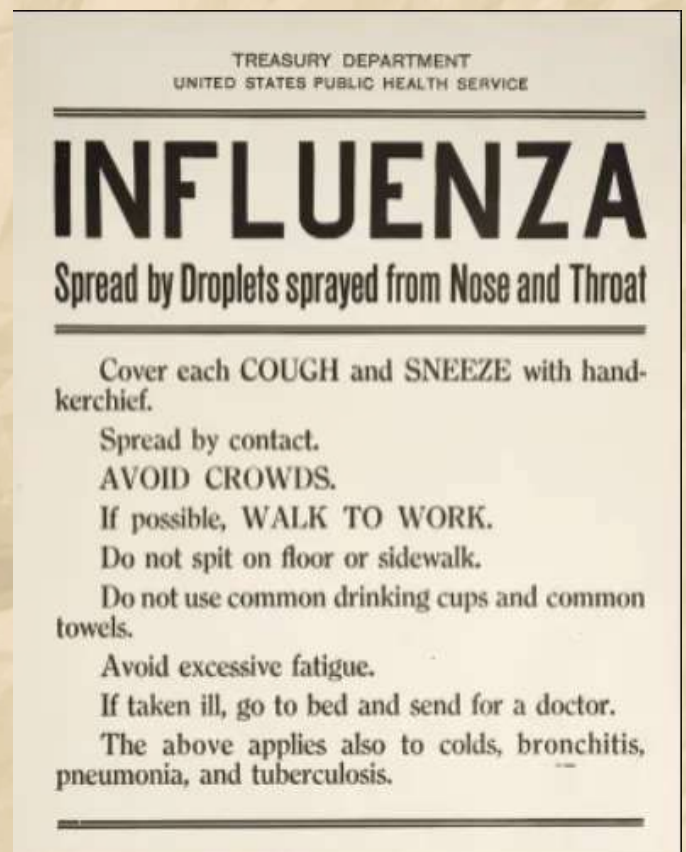
A family of viruses that brought the world five pandemics and continues to bring seasonal endemics around the world. The first of its pandemics was the Russian Flu which infected the whole planet in the years between 1889 and 1893 and was caused by the A/H3N8 Virus and took only four months to circumvent the entire earth. The most famous of its pandemics though, is perhaps, the Spanish flu that arose only twenty-five years later and lasted for two years from 1918 to 1920. It caused the death of over 50 million people worldwide.

The pandemic spread in three distinct waves, not unlike the COVID-19 pandemic with the second and third waves having the highest mortalities. Also like COVID-19, the A/H1N1 Virus was spread through respiratory droplets too.

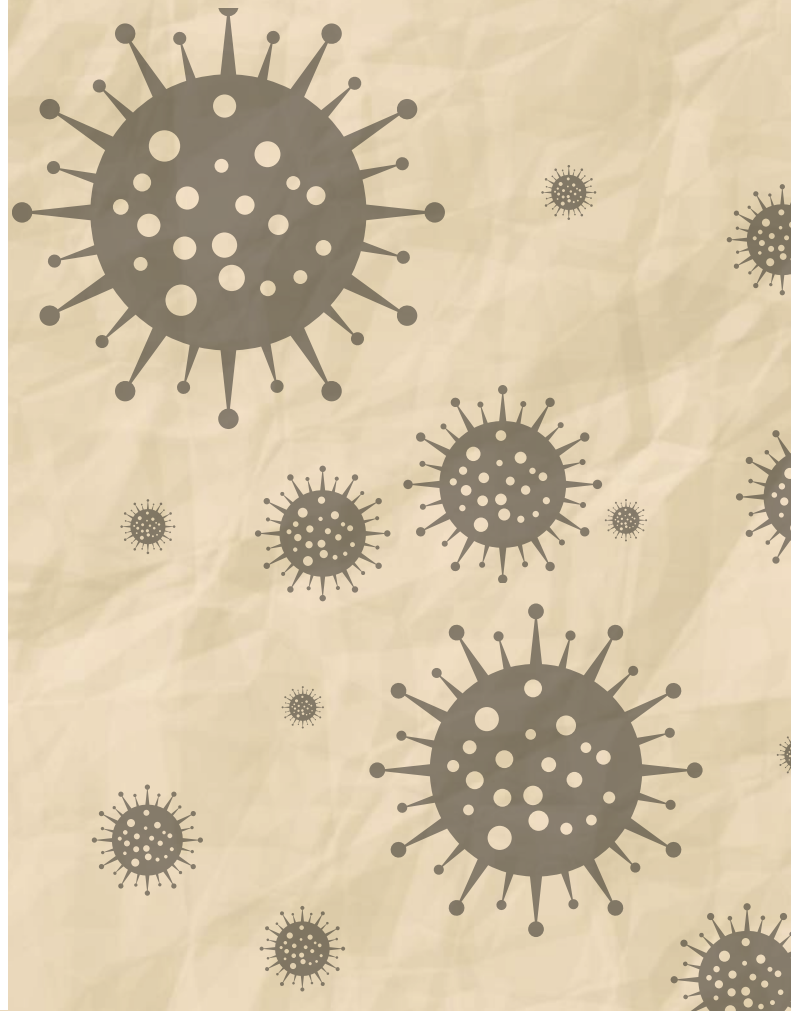
During this time, the first world war was also in progress. It impacted the pandemic so severely that it took a long time for people to even know there was a pandemic festering right under their noses!

The war caused shortages of medical personnel such as doctors and nurses. It also caused economic instability and money shortages for nations so that proper infrastructure could not be made available.

So, how did they make it in an era where war abounded and medicine had not yet stepped its game up? You guessed it! Our old pals Quarantine and Self-isolation!



Pamphlets and public health notices such as these were circulated to spread awareness about influenza. (Image credit: <http://resource.nlm.nih.gov/101453499>)



Disease containment was an important pillar in getting the virus under control. Major cities around the world announced closures of schools, churches, theatres and any public gatherings. A large annual sporting event in Paris was closed down and all universities announced the cancellation of on-campus meetings.

These measures of quarantine and isolation were naturally met with heavy opposition. Particularly, the decision to close schools and universities as they did not have any other means of continuing education back then.

Face masks were also made mandatory for the public to slow the spread of the disease.

Despite all this, the measures taken were not sufficient. They were enforced too late and were not implemented properly, especially, in war-torn regions. Soldiers in the trenches suffered most of all.

By the beginning of 1920, the pandemic started to dissipate naturally and returned as a seasonal endemic.

COVID-19

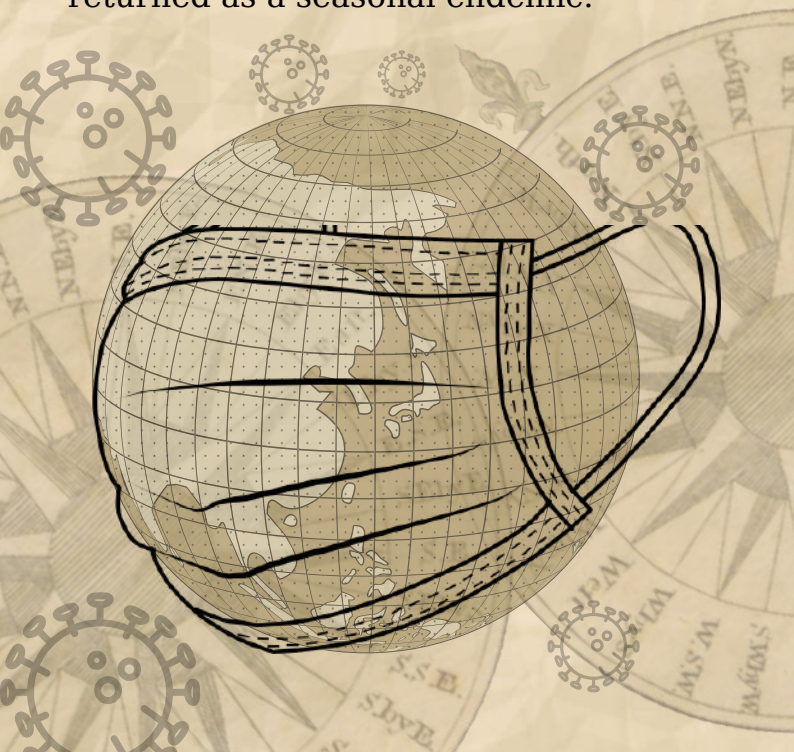
In many ways, the COVID-19 pandemic was not as taxing on humankind as the previous pandemics. That is not to say it wasn't taxing at all. The world saw 510 million infections and 6.2 million deaths. Many developing countries suffered heavy losses and as did the developed countries. But due to protocols already being in place, the world could move swiftly in flattening the curve of infections.

Medicine has also evolved immensely in the past century. Availability of modern antiviral and antibiotic medicines, PPE Kits, machines such as ventilators and other detection and testing techniques which were not available earlier played a key part in keeping the mortality low along with tried and tested techniques such as Quarantine and isolation.

Vaccines were also made available in record time after being developed and tested in only 18 months.

At the time of writing this, more than half of the world is partially vaccinated while a quarter is fully vaccinated. The state I live in has eased its mask mandates and, public places, as well as educational institutes, have opened again.

And while we owe this victory to our medical and scientific community who have worked tirelessly in the pandemic, we also owe it to our previous generations and to the community that learnt from their mistakes and made better on them. We owe it to the scientists from the past who improved medicine and public health protocol so marvellously and efficiently that we are now seeing the end of this very long tunnel.



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PPE Kits and modern machinery and medicine helped decrease the COVID mortality rate significantly. (Img Credit: ABC News)

CORONAVIRUS

Stop Pandemic



Art Of Living Yoga

-By Shravani Nirgude

What is yoga?

Yoga is an essential spiritual discipline based on an extremely subtle science. It is a group of physical, mental, and spiritual practices of disciplines which is originated 5000 years ago in the history of Indian philosophy. Yoga aims to control the mind and body. It combines various styles of meditation, physical postures, breathing techniques, and relaxation. The word "YOGA " is derived from the Sanskrit root 'YUJ' meaning ' to unite'. As per the ancient yogic scriptures, the practice of yoga leads to the union of individual consciousness indicating a perfect

balance between mind, body, and nature.

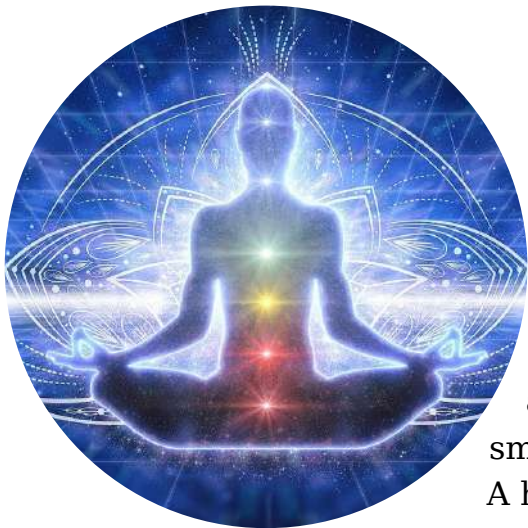
How is YOGA helping us in recent times?

Yoga is a form of spiritual awakening carried out by the Hindu theistic philosophy dating back five thousand years. However in the recent generation yoga has been extremely powerful and helpful in dealing with stress, anxiety and depression in the time of modernization and fast-paced lifestyle. The Science Behind Yoga Apart from the spiritual aspects, the physical benefits obtained from yoga have lately had a revolutionary scientific understanding behind its mechanism. It is also modest the outpouring and the manufacture of chemicals in the body that affect us mentally, physically, and

psychosomatically. So let's educate ourselves on the science behind Yoga which makes it helpful!

Secretes antioxidants enzymes

The continuous exhibition of environmental pollutants and metabolic by-products results in the formation of free radicals, which are implicated in various diseases including cancer, and fastens the aging process. To counteract free radicals, the human body possesses a powerful internal defense system in the form of antioxidant enzymes. In some research the level of antioxidant enzymes was found to be



significantly higher in people practicing yoga, thus enhancing the defence against free radical damage.

Moderates Stress Enzymes

Yoga is a stress reliever form of exercise that helps to cure depression, anxiety, and many mental health issues caused by recent lifestyles followed by people. When the body gets extremely stressed it releases a hormone called cortisol which keeps us awake in crucial situations. Yoga and meditation help to be stress-free and therefore moderate the production of the hormone in the body and keep the individual calm and focused.

Yoga helps cure addiction

Addiction is huge issue in teens and adults.

During the period of gen z, even children are haunted by addiction.

There are various types of addiction such as alcoholism, smoking, screen addiction, etc. A hormone called dopamine a certain type of chemical in the brain that gives one satisfaction. This hormone is generated naturally by doing yoga. Thus, the craving for that level of addiction isn't needed for the body. Therefore, it helps to cure any type of addiction.

Enlarges the brain and helps control breathing

Meditation has been a huge branch of Yoga. It helps us to control our breathing by practising particular forms of mudras. The 2 main mudras are known as "अनुलोम - विलोम", this means breathing in and out with the help of fingers. Scientists have discovered with the help of numerous MRI scans they say that people who practice yoga have more brain cells than the non-yoga practitioners do. Research in history mentions that yoga has been the contributing factor to the bigger brain size. In terms of spiritual sayings,

it is said that yoga and meditation help us to awaken the 7 chakras present in our body which are related to our soul and connection to spiritual aspects.

Helps to stay in present

It's an issue for a lot of teenagers out there between the age between 14-21 that the lack of concentration is very high. It is not a good sign at this certain age and might even affect them when they come to the adult phase. Yoga helps us in increasing concentration and being attentive in the present and helps us to overcome negative thoughts and to deal with life with a greater vision.

Yoga mudaras

Yoga mudras are hand gestures that stimulate certain parts brain and body.





Adi mudra

Adi mudra is a hand gesture that is performed as a fist. It relaxes the nervous system.

Merudanda mudra

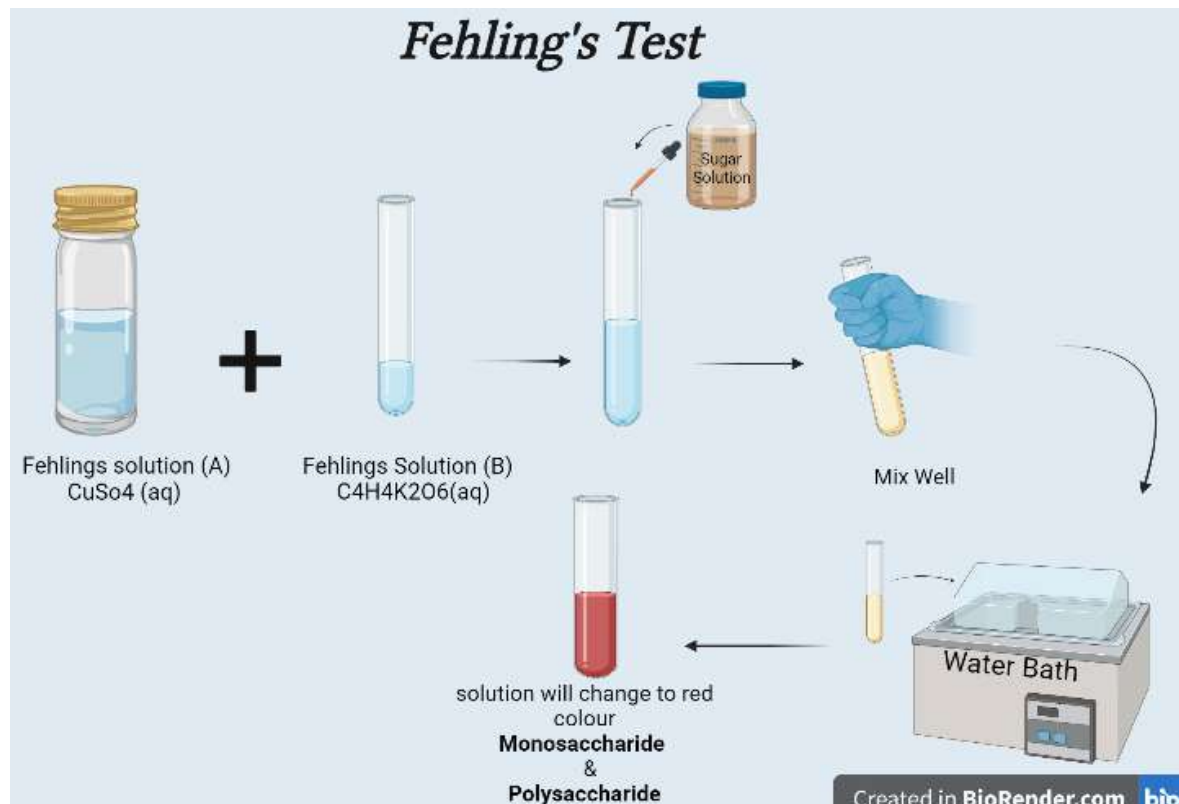
In this hand gesture, the tip of your forefinger and thumb touch each other by extending all fingers. This mudra helps improve sleep patterns and increases energy.

Chin mudras

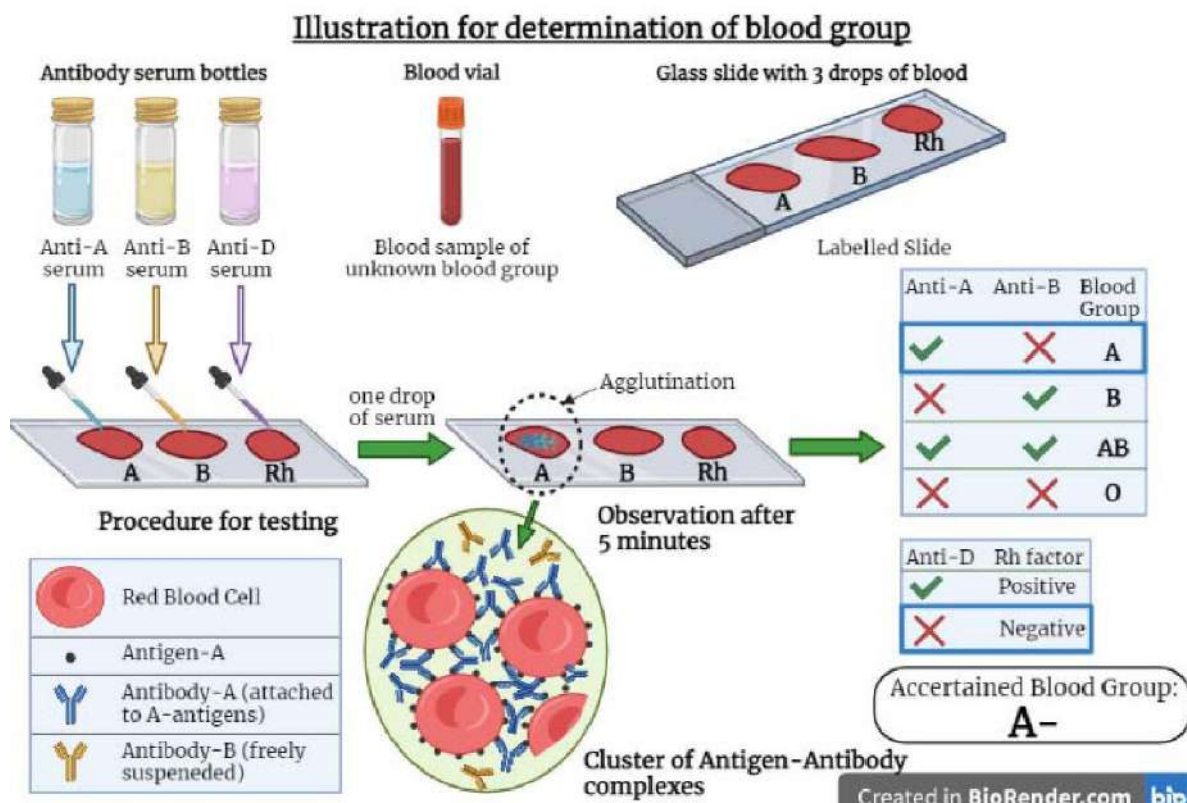
In this one, the thumb is pointed upwards and fingers are rolled, this mudra energizes the middle section of the human body.

Well, yoga may look like some simple body-bending exercise also known as asanas to the normal eye, but a lot goes into the body when you twist your limbs and breathe consciously. Yoga is a way of life, it's an art of living that every individual should perform for their well-being. With a healthy body and calm mind, you can achieve your goals and live a happier life. But do ensure you learn yoga under a professional trainer and practice for long-term benefits.

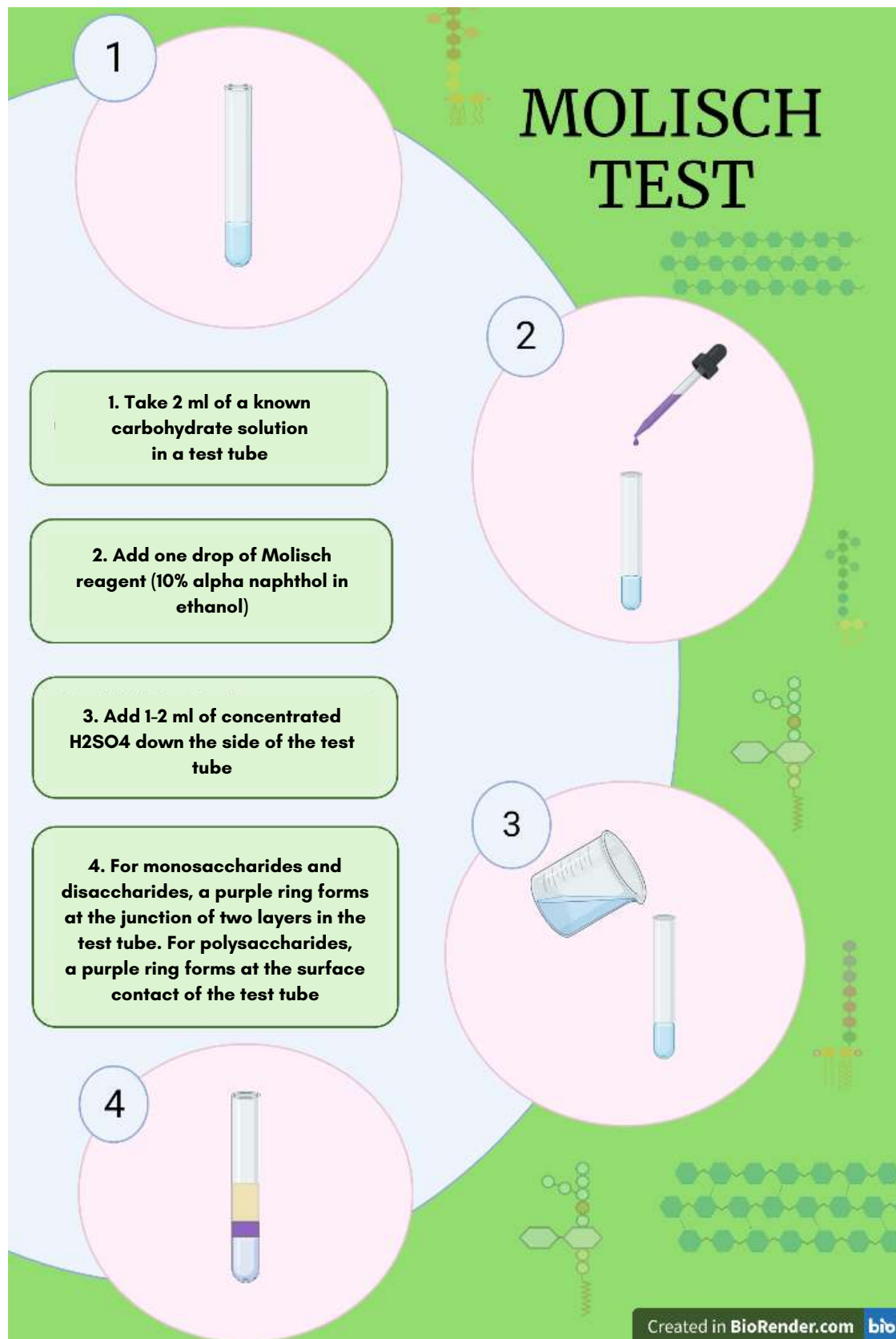




Illustrated by Raisa lobo



Illustrated by Suzzane Mondal



Use of the CRISPR/Cas9 system as an intracellular defense against HIV-1 infection in human cells

To combat hostile viruses, bacteria and archaea have evolved a unique antiviral defense system composed of clustered regularly interspaced short palindromic repeats (CRISPRs), together with CRISPR associated genes (Cas). Using HIV-1 infection as a model, our results demonstrate that the CRISPR/Cas9 system disrupts latently integrated viral genome and provides long-term adaptive defense against new viral infection. The results unveil the potential of the CRISPR/Cas9 system as a new therapeutic strategy against viral infections.

Authors : Pratiksha & Moyuri

INTRODUCTION

HIV is a lentiviral infection, i.e. it invades our lymphocytes and causes infection. The lack of immune response to eliminate the latent viral genome from reservoirs constitute the major challenges that need to be overcome.

Here we apply the CRISPR/Cas9 system to directly target and disrupt the reverse-transcribed products of the lentiviral RNA genome during their life cycle within host cells.

We screen multiple potential gRNA target sites in the HIV genome and identify optimized targets that enable effective and long-term protection against HIV-1 infection in primary human T cells and human pluripotent stem cell (hPSC) derived HIV reservoir cell types.

METHODOLOGY

- Cell culture
- Primary T cell
- Retrovirus and adenovirus production
- HIV-1 reporter virus preparation and infection
- Plasmid design and construction
- gRNA design and off-target assay
- p24 western blotting and ELISA
- Cas9 western blotting
- Fluorescence microscopy
- Flow cytometry
- Provirus copy number detection
- Cell viability assay
- Relative copy number detection
- TA cloning and sequence
- Monocyte/macrophage differentiation from hPSCs
- Statistical analysis

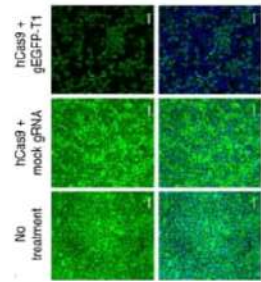


Figure 2 | CRISPR/Cas9 directed disruption of integrated HIV-1 provirus. CRISPR/Cas9 mediated disruption of integrated HIV-1 proviral DNA in HEK293 cells

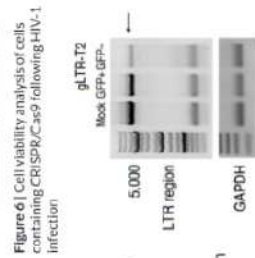


Figure 3 | PCR analysis of proviral DNA

Figure 6 | Cell viability analysis of cells containing CRISPR/Cas9 following HIV-1 infection

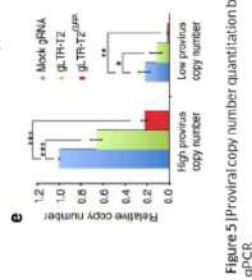


Figure 5 | Proviral copy number quantification by qPCR

RESULTS

- The integrative lenti-EGFP expressed constitutively from 7 days after infection, where as the expression of non-integrative lenti-EGFP gradually reduced over time. (Fig 1)
- By targeting different regions, the results indicate that Cas9 guided by different gRNAs accurately distinguishes between the two lentiviral vectors.
- Cas9 inactivates viral EGFP expression to a similar extent regardless of the integration status of the lentivirus.
- The Cas9 showed its ability to inactivate expression of invading plasmids at a comparable level, to disrupt the infectious lentivirus. (Fig 2)
- CRISPR system could efficiently disrupt the activities of proviruses regardless of copy number. (Fig 5)
- Cas9 can mediate targeted disruption of both pre-integration viruses and integrated proviruses with dsDNA in either linear or circular format.
- The release of p24 viral protein and production of GFP were decreased.
- Engineered Cas9 hPSCs can confer resistance to HIV-1 infection in derived monocytes/macrophages. (Fig 6)

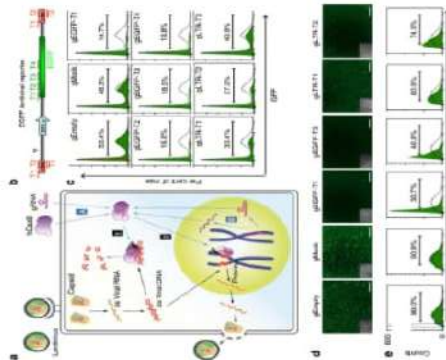


Figure 1 | CRISPR/Cas9 directed disruption of lentivirus infection.

- Model of CRISPR/Cas9 directed intracellular defense against lentiviral infection.
- Seven gRNAs were designed and used with hCas9 to target corresponding regions in the EGFP reporter lentivirus.
- FACS analysis of HEK293 cells.
- Fluorescence microscopy images of HEK293 cells pretreated with CRISPR/Cas9 followed by non-integrative lentivirus infection.
- EGFP expressions of invading non-integrated lentivirus.
- Average of MFI (mean fluorescence intensity) from triplicates of FACS analysis.
- Time-course analysis of EGFP expression from integrative and non-integrative lentiviruses without any treatment with CRISPR/Cas9.

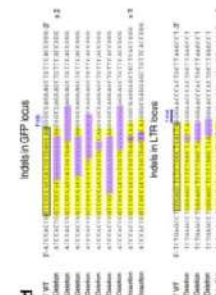


Figure 4 | DNA sequencing analysis of the CRISPR/Cas9 target sites in the EGFP proviruses

CONCLUSION

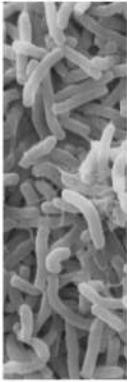
The present work indicates that the bacterial CRISPR/Cas9 adaptive immune machinery can be adapted into human cells as a novel anti-virus tool.



Isolation of Antibiotic Resistant Plasmid Deoxyribonucleic Acid from Diarrheal Pathogens

Authors

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by

Kanak Gupta
Rohan Havalad
Ria Saha

Poster

Isolation of antibiotic resistant plasmid deoxyribonucleic acid from diarrheal pathogens

Abstract

Cholera is a bacterial disease causing severe diarrhoea and dehydration. Usually spreads in water. *Vibrio cholerae* is the bacteria which causes cholera. This bacteria is resistant to many antibiotics like ampicillin, tetracycline, erythromycin. The antibiotic resistance of this bacteria has been creating problem in many countries since long. The symptoms seen during cholera in patients are fever, abdominal cramp, vomiting and dehydration. A research was conducted in Tirupur district of Tamil Nadu, where 50 diarrheal samples were taken. 25 samples tested positive for bacteria. *V. Cholerae* Those strains were isolated based on their morphology and chemical nature. By disc diffusion method antibiotic susceptibility test was done. Through this test they could identify how resistant was this bacteria against antibiotics. Using agarose gel electrophoresis method the antibiotic resistant DNA Plasmid was isolated. Using KBI DNA base pair the molecular weight of the plasmid was found which came out to be 1500 base pairs.

Introduction

*Cholera is common in places where hygiene and sanitation is ignored. It is a dangerous disease. According to WHO (world health organization) almost around 1.5 million to 4 million Cholera cases are recorded globally and more than 1 lakh deaths are recorded. This disease has caused high morbidity and high mortality all over the world which is concerning. Over many years doctors have been suggesting antibiotics like tetracycline and Azithromycin for the treatment. This bacteria has evolved and altered a lot to exist in the environment and become resistant which has become a global issue.

The current study attempted to demonstrate that the purpose of the susceptibility test was

1. to guide the choice of antibiotic treatment for individual patients and
2. to provide scrutiny data to monitor resistance trends, including epidemiological data, and to provide the resistance gene linked with plasmid.

Objective

To point out the purpose of the susceptibility test and to guide the choice of the antibiotic treatment for the individual patients and provide scrutiny data to monitor resistance trends including the epidemiological data are to provide the resistance gene linked with plasmid.

Reference

<https://bbcr.in/isolation-of-antibiotic-resistant-plasmid-deoxyribonucleic-acid-from-diarrheal-pathogens/>

Methodology

The above following shows the diarrheal samples collected from Tirupur. The isolation and identification of *Vibrio* species from the watery diarrheal sample were based on Thiosulfate Citrate Bile Salts Succose (TCBS) agar plates at 37°C for 18-24 hours aerobically followed by staining and biochemical tests.

The diarrhoea causing *Vibrio* species were detected through a range of biochemical tests. (The AST was taken from disc diffusion, AST are the complex test)

The antibiotics checked in the test were:

1. Ampicillin
2. Bacitracin
3. Clindamycin
4. Erythromycin
5. Piperacillin
6. Tetracycline
7. Trimethoprim

Their efficiency of antibiotics is checked through AST. On the basis of their efficiency, they were classified as sensitive, intermediate, and resistant to *V. cholerae* (*V. Cholera* bacteria).

(This test was performed by Holmes and Quinley in 1981)

DNA of electrophoresis, was done by Agarose gel Electrophoresis. Limit was set to 0.7%

The weight was calculated using 1kb DNA ladder

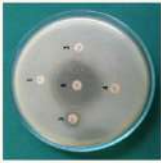
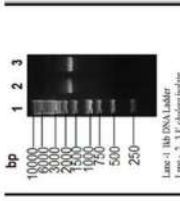


Table 1. Biochemical characterization of *V. cholerae*

S. No.	Reaction	Result
01.	Grams Staining	Negative
02.	Indole	Positive
03.	Methyl red	Negative
04.	Voges proskauer	Positive
05.	Citrate	Positive
06.	Mentality	Positive
07.	Sucrose hydrolysis	Positive
08.	Triple sugar iron agar	Negative
09.	Crimithine Decarboxylase	Positive
10.	Arginine Dihydrolase	Negative

Table 2. Antibiotic resistant percent of *V. cholerae*

S. No.	Name of the antibiotics	% of resistance
01.	Ampicillin	90 %
02.	Bacitracin	69 %
03.	Clindamycin	84 %
04.	Erythromycin	97 %
05.	Piperacillin	52 %
06.	Tetracycline	90 %
07.	Trimethoprim	50 %



Results

50 diarrheal samples were collected from Hospitals and PHCs of rural Kangiyam in Tirupur

It was confirmed by TCBS agar. *V. cholerae* was identified by biochemical tests.

Afterwards the bacteria was tested for its resistance towards antibiotics by disc diffusion method.

Resistance against Erythromycin was 97%

Resistance against Trimethoprim was 54%

Strain NSKVC24 showed max resistance whereas strain

NSKVC26 showed min resistance.

Electrophoretic probe of DNA plasmid was done by Agarose gel

electrophoresis on 0.7%

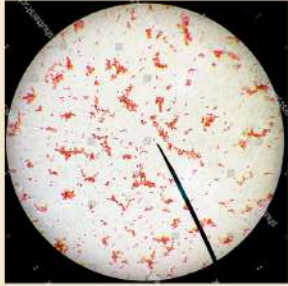
NSKVC24 & NSKVC26 showed more than 90%- resistance

against antibiotics.

Conclusion

This research has led to some conclusions. It was found that day by day *V. Cholerae* was developing resistance to antibiotics.

The presence of a large number of Multi-Drug Resistant isolates necessitates a reduction in irrational antibiotic use in order to prevent the spread of drug resistance. In the future, novel therapeutic drugs will be required to combat this dreadful disease.



Poster by Kanak Gupta, Rohan Havalad and Ria Saha



Neurorobotics is the combined study of neuroscience, robotics, and artificial intelligence. It is the technology behind embodied autonomous neural systems. Neuro-robots utilize neural structures and mechanisms inspired by living creatures, especially insects, to achieve efficient sensing and reaction to the dynamic world.

The development and application of neuro-robots is a path that combines discovery of the underlying mechanisms, in highly efficient biological neuro-structures, and solutions to the bottleneck of processing a large number of unnecessary information in the vast majority of artificial intelligence applications.

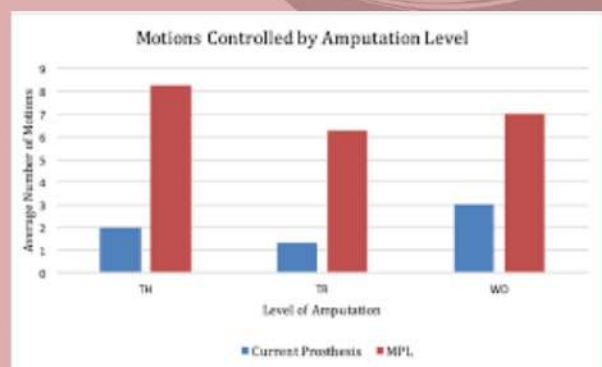
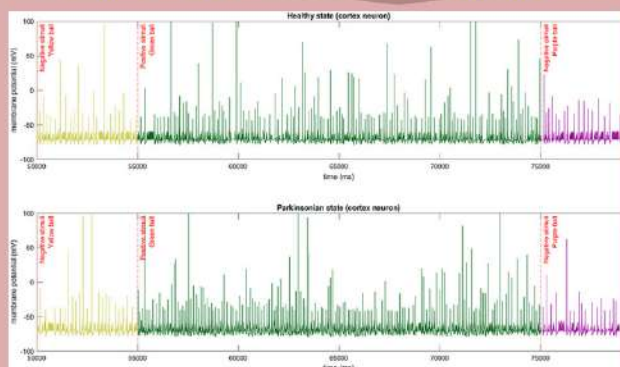
Neurorobots can be a powerful tool for studying neural function in a holistic fashion.

APPLICATIONS

Brain function and reverse Engineering

- AI-Driven Navigation :Autonomous path finding and navigation
- Brain-machine interfacing:smart prosthetics
- Brain-inspired sensory perception and learning systems

An initial Neuro robotics model of parkinson's disease:



Research was conducted by using Neuro robots for Parkinson's disease.

During the research the scientists simulated dopaminergic neuron death in a two channel behaviour selection model of the basal ganglia, constructed with leaky-integrator artificial neurons, and utilize with a genetic algorithm. This structure was mounted on a lego robot. The robot would move around and about in the open space. The PD robot did not perform any behaviour in almost half of the experiment but its behavior sequence separated into short fragments, compared to normal control.

NEURALINK:

Neuralink, a start up by Mr elon musk is a neurotechnology company is working towards making a device that would permit a computer to translate a person's thoughts into actions when it is implanted into the brain. It could also, in the future used to create a brain connected artificial limb for amputees. Primary somatosensory cortex, would in that case would be sent signals wirelessly. The electromyography signal (EMG) is used to operate the servo motor through a microprocessor to control the line of the body-powered prosthesis.

Poster By Shruti Tonde

20210901046

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<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC148042/>
<https://fortune.com/longform/neuralink-brain-computer-interface-chip-implant-elon-musk/>

EFFECT OF SUNLIGHT EXPOSURE ON COGNITIVE FUNCTION AMONG DEPRESSED AND NON-DEPRESSED PARTICIPANTS: A REGARDS CROSS-SECTIONAL STUDY

Authors

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Affiliations

This research project is supported by a cooperative agreement U01NS041688 from the National Institute of Neurological Disorders and Strokes, National Institutes of Health, Department of Health and Human Services. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Neurological Disorders and Stroke or the National Institutes of Health.

INTRODUCTION

It is widely accepted that climate and season affect psychological characteristics [1, 2]. Recent research has shown that serotonin and melatonin regulation, mechanisms that are involved in the relationship between sunlight and light therapy on mood, are also involved in cognition, which suggests that cognitive function may also be influenced by light [3-5]. Melatonin, serotonin and other mechanisms involved in circadian rhythms are associated with cognitive functioning, and are regulated by the suprachiasmatic nuclei (SCN), which are susceptible to the effects of differing intensities and patterns of environmental illumination [6]. However, the effect of sunlight and light therapy on cognitive function has not been adequately studied. This study aimed to explore if sunlight exposure, measured by insolation (the rate of solar radiation received in an area), is associated with cognitive impairment.

ANALYSIS

The fact that sunlight exposure was associated with cognition in depressed participants supports our hypothesis that the physiological mechanisms which give rise to seasonal depression may also be involved with sunlight's effect on cognitive function. Leonard and Myint, 2006 laid out a paradigm showing how lack of environmental illumination and other stresses might lead to altered serotonin levels, neurodegeneration, depression, cognitive deficits, and ultimately dementia.

CONCLUSION

We found that among participants with depression, low exposure to sunlight was associated with a significantly higher predicted probability of cognitive impairment. This relationship remained significant after adjustment for season. Among participants without depression, insolation did not have a significant effect on cognitive function.

OBJECTIVE

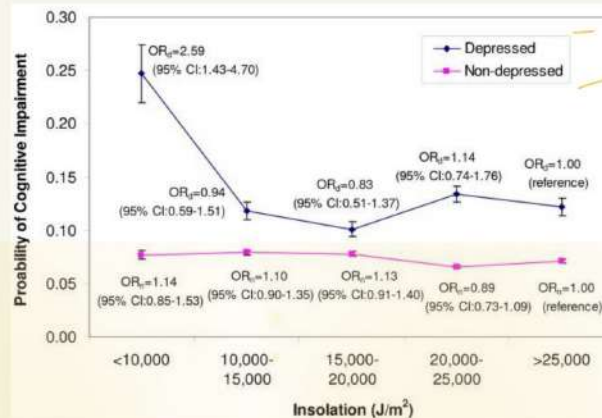
Possible physiological causes for the effect of sunlight on mood are through the suprachiasmatic nuclei and evidenced by serotonin and melatonin regulation and its associations with depression. Cognitive function involved in these same pathways may potentially be affected by sunlight exposure. We evaluated whether the amount of sunlight exposure (i.e. insolation) affects cognitive function and examined the effect of season on this relationship.

METHODOLOGY

We obtained insolation data for residential regions of 16,800 participants from a national cohort study of blacks and whites, aged 45+. Cognitive impairment was assessed using a validated six-item screener questionnaire and depression status was assessed using the Center for Epidemiologic Studies Depression Scale. Logistic regression was used to find whether same-day or two-week average sunlight exposure was related to cognitive function and whether this relationship differed by depression status.

RESULTS

Among depressed participants, a dose-response relationship was found between sunlight exposure and cognitive function, with lower levels of sunlight associated with impaired cognitive status (odds ratio = 2.58; 95% CI 1.43-6.69). While both season and sunlight were correlated with cognitive function, a significant relation remained between each of them and cognitive impairment after controlling for their joint effects.



Related literature

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RSinclair RC, Mark MM, Clore GL: Mood-related persuasion depends on (mis)attributions. Social Cognition. 1994, 12: 309-326.



PROSTHETIC ARM CONTROL BY HUMAN BRAIN



AFFILIATIONS

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University of Technology, Taichung, Taiwan

AUTHORS

Orgil Chinbat and Jzau-Sheng Lin



1

INTRODUCTION

They provide a BCI system to handicapped people suffering from various debilitating conditions such as induration disorder or amyotrophic lateral sclerosis (ALS), brain or medulla spinal is damage, myasthenia, brain-stem stroke, encephalopathy. Signal extraction, signal collection, and signal distribution are critical building pieces for this interface Emotiv EPOC is a new EEG technology that is used to remotely operate physical or software devices by measuring levels of attention, conscious thoughts, and facial expressions.

2

ABSTRACT

There are hundreds of millions of neurons in the human brain. The electroencephalogram (EEG) signal is used to find problems related to electrical activity in the brain. The EEG-based Brain-Computer Interface (BCI) prosthesis acts as a powerful support device to help people with severe disabilities support normal activities, especially the spontaneous movement of their arms.

3

EXPERIMENTAL STUDIES

- The concentration and meditation levels are the two characteristics used to govern the robotic arm's various activities.
- The Emotiv EPOC headgear contains 16 electrodes for measuring electromagnetic pulses from the brain.
- These electromagnetic pulses are produced as a result of purposeful thoughts, facial expressions, and even the user's mental condition.
- The microcontroller receives raw brainwaves and compares them to the predefined levels before performing the prescribed action.

4

SYSTEM DESIGN



System design is broadly divided into 4 stages:

- EEG Signal Detection
- EEG Signal Acquisition
- Signal transmission
- Mapping into appropriate prosthetic arm action

5

ANALYSIS

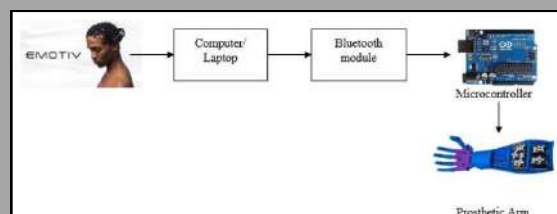
The level of consciousness and meditation are two parameters for controlling various movements of the robot arm. These values can be divided into different levels. Specific actions are set for each level. According to the raw brain waves sent to the microcontroller, it examines the classified levels and performs predefined actions.

COMMANDS	TIME UNITS OF EXTRACTED SIGNALS	MOTION	ACTIONS
ATTENTION	20-45	MOVE INDEX FINGER	ACTION 1
ATTENTION	45-70	MOVE MIDDLE FINGER	ACTION 2
ATTENTION	70-95	MOVE RING FINGER	ACTION 3
MEDITATION	20-45	MOVE PINKY FINGER	ACTION 4
MEDITATION	45-70	MOVE THUMB FINGER	ACTION 5
MEDITATION	70-95	CLOSE THE ALL FINGERS	ACTION 6

6

CONCLUSION

The proposed arm shows the advancement in technologies and body control order. More number of EEG signals would increase the accuracy of the signals' interpretation. In future work, we would like to consider these methods to improve accuracy so that we can start running tests of on the efficiency of this control system.



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- S. W. Hawking, "World report on disability," WHO, Switzerland, 2011
- J.S. Lin, K.C. Chen and W.C. Yang, "EEG and eye-blinking signals through a Brain-Computer Interface based control for electric wheelchairs with wireless scheme" 4th ICNTIS, pp. 731-734, May, 2010



A look into NASA's Twins Study

Humanity is accelerating towards the stars.

As more long-duration flights and commercial flights to space are planned, it becomes important to understand the state of the human body in space to provide healthcare up there.

NASA's twin study explored just that.

Scott Kelly, one of the twins, lived on the ISS for 340 days!

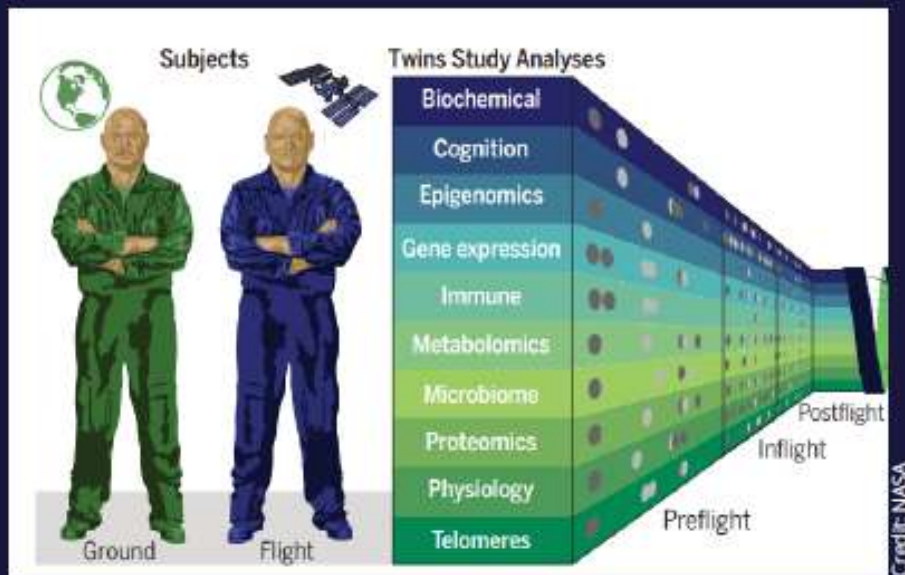
He was tested pre-flight, mid-flight and post-flight. His results were compared to the results from the earth-bound twin, **Mark Kelly**.



Pic: Twins, Scott and Mark Kelly

Credit: NASA

The Twins were tested based on the following parameters:



Credit: NASA

Let's look at some of the discoveries that have been made through the analysis of this data!

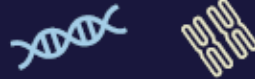
What are some of the changes occurring in the body when in space?

Prominent changes such as decrease in bone density and muscle mass as well as the shift in fluid orientation towards the head and upper extremities is seen even in short duration stays in space although they are greater in magnitude for astronauts staying longer.

For longer flights, the most significant change can be seen in **gene regulation**. Most of Scott's genes featured epigenetic markers.

Epigenetic markers are modifications found in the DNA when the body is subjected to harsh environments.

These markers, however, disappeared soon after returning to earth. Some genes were also found to be expressed more while others less.



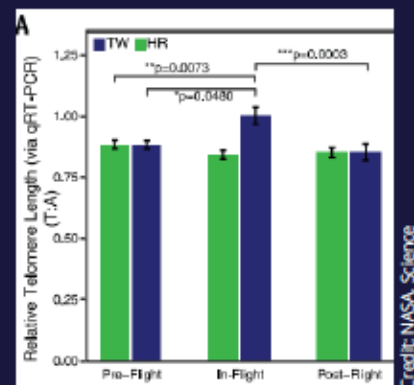
Telomeres showed one of the most unique reactions to space travel.

Telomeres are the end regions that cap the chromosomes. Each time a cell divides, telomeres become shorter until they are so short that the cell cannot divide any longer and dies.

Scott Kelly's telomeres showed an **increase in their lengths** when in space.

But upon landing, in weeks, the telomere length returned to pre-flight conditions.

This is shown in the chart. TW (blue) shows the length of Scott's telomeres while HR (green) show the length of his earth-bound twin: Mark.



This was also the **very first time a vaccine had been administered in space.**

Fortunately, the immune response was the same as on earth. This means, astronauts, can now be administered vaccines in space and thus prevented from catching diseases.

A large amount of data was obtained from this study.

It can act as a guide to further missions, particularly manned-missions to monitor astronauts' health and to **implement targeted responses** to the changes occurring in the body when in space.

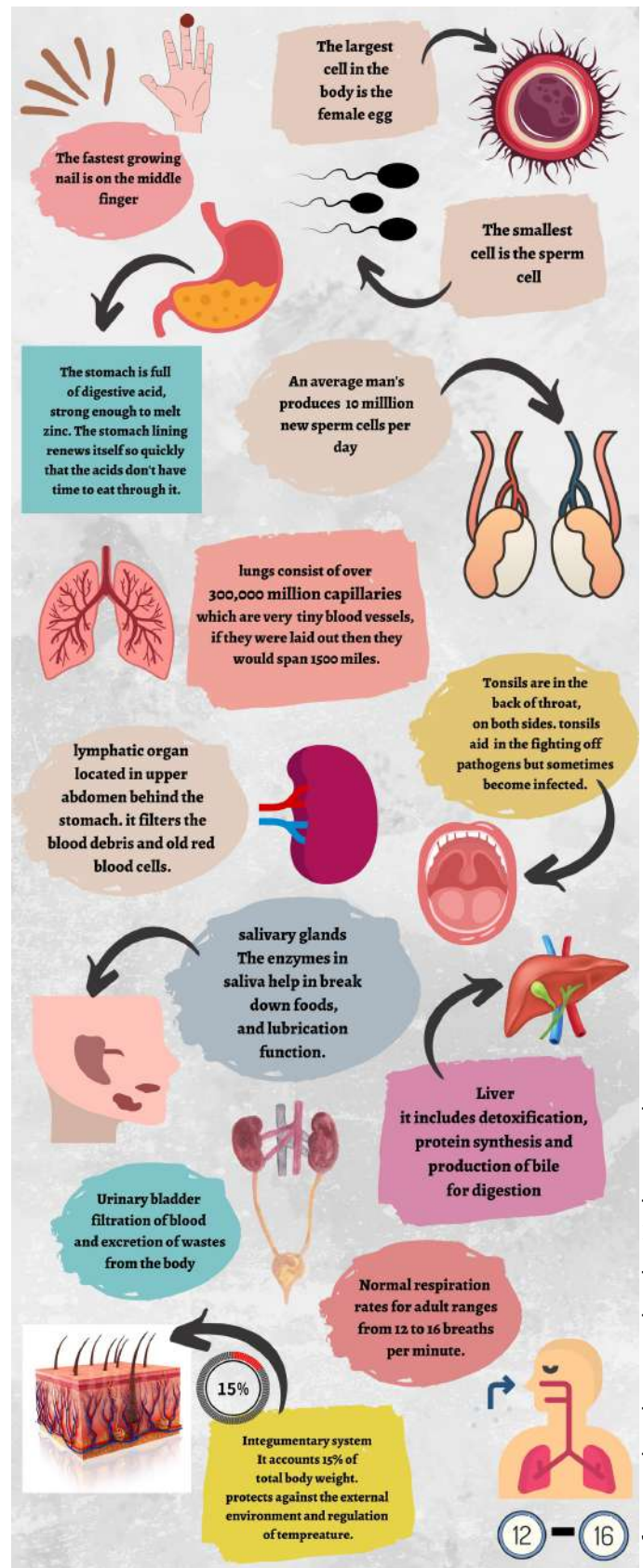
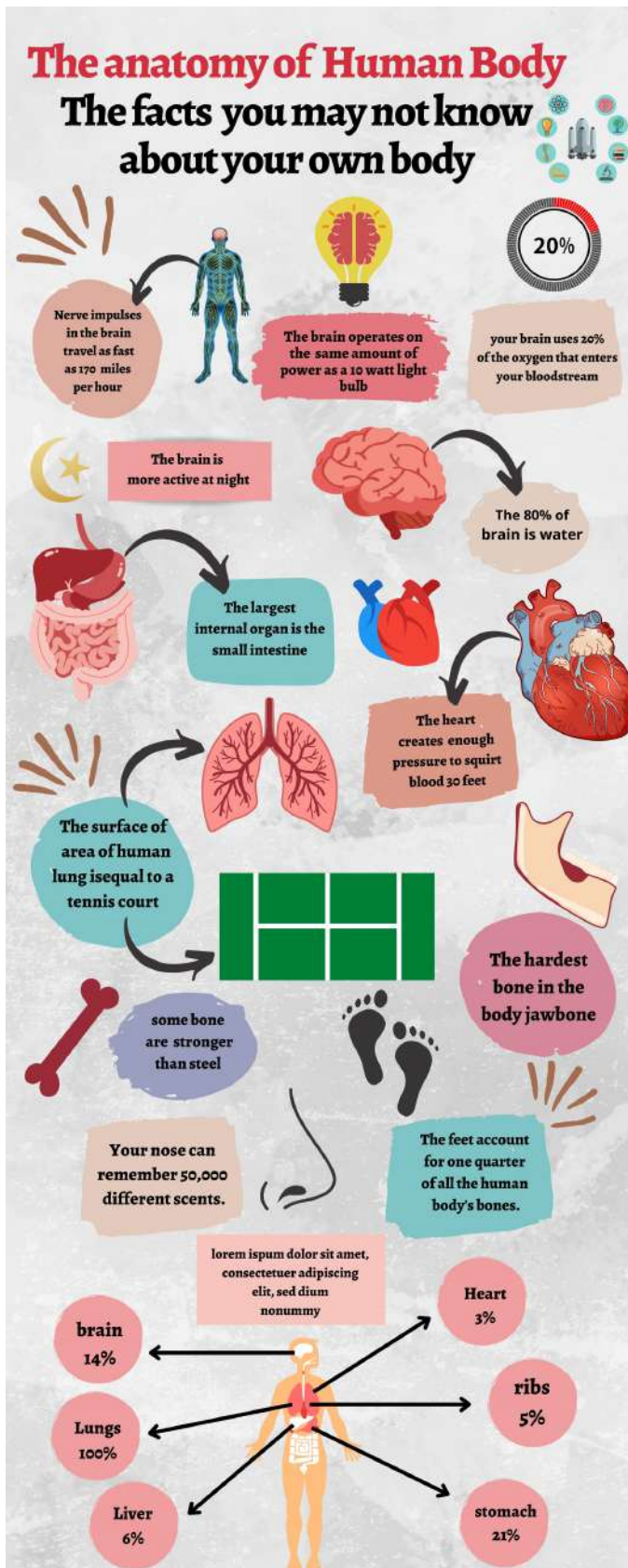


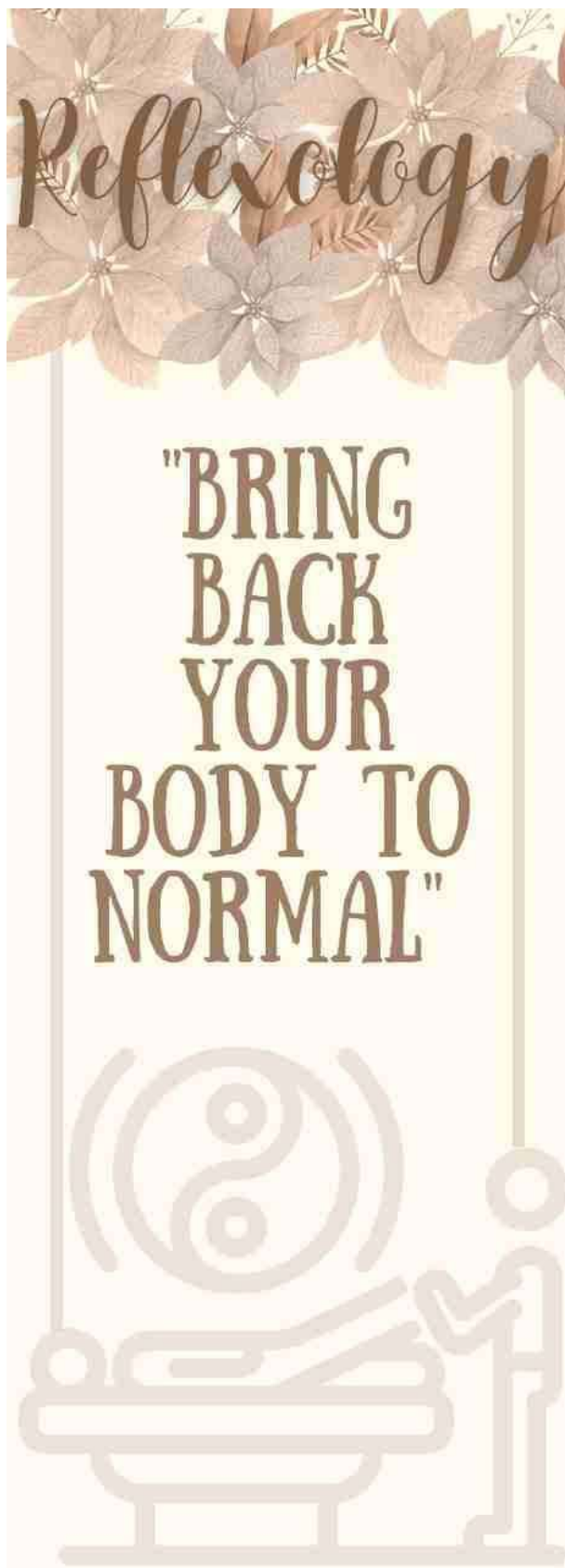
Pic: Scott Kelly administers a vaccine to himself aboard the ISS.

Credit: NASA

Citations and Further Reading:

- F. E. Garrett-Bakelman et al., "The NASA twins study: A multidimensional analysis of a year-long human spaceflight," *Science* (80-), vol. 364, no. 6436, 2019, doi: 10.1126/science.aau8650.
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APPLICATION ON AREAS OF THE FOOT THAT CORRESPOND TO ORGANS AND SYSTEMS OF THE BODY		
DEPRESSION	FEVER	COMMON COLD
Massage the points on top of each toe for 30-60 sec, to promote the production of serotonin.	Massage this point for 30-60 sec to provide relief.	Massage this point for 30-60 sec to provide relief.
HIGH BLOOD PRESSURE	MENSTRUAL CRAMPS	INSOMNIA
Massage these points on both the feet for 30-60 sec, to relax the flow of blood.	Massage these points on both the feet for 30-60 sec, to get relief from cramps.	Massage these points on both the feet for 30-60 sec, to relax the body.
MIGRAINE	ACIDITY	CONSTIPATION
Massage these points on both the feet for 30-60 sec. Repeat if needed.	Massage these points on both the feet for 30-60 sec, to relax the flow of blood.	Massage these points for 30-60 sec. Repeat if needed.
SHOULDER PAIN	KNEE PAIN	STOMATITIS
Massage these points on both the feet for 30-60 sec. Repeat if needed.	Massage these points on both the feet for 30-60 sec. Repeat if needed.	Massage these points for 30-60 sec.
COUGH	EAR ACHE	NAUSEA
Massage these points on both the feet for 30-60 sec. Repeat if needed.	Massage these points on both the feet for 30-60 sec. Repeat if needed.	Massage this point in a circular motion for 30-60 sec. Repeat this thrice.

DIY HAND Reflexology 		
APPLICATION ON AREAS OF THE HAND THAT CORRESPOND TO ORGANS AND SYSTEMS OF THE BODY		
DEPRESSION	FEVER	COMMON COLD
 Massage this point for 30-60 sec. Repeat this if necessary.	 Massage these points for 30-60 sec. Repeat this thrice.	 Massage these points on both hands for 30-60 sec to provide relief.
HIGH BLOOD PRESSURE	MENSTRUAL CRAMPS	INSOMNIA
 Massage these points on both hands for 30-60 sec to provide relief.	 Massage these points on both hands for 30-60 sec to provide relief.	 Massage this point for 30-60 sec. Repeat if necessary.
MIGRAINE	ACIDITY	CONSTIPATION
 Massage this point for 30-60 sec. Repeat if necessary.	 Massage these points for 30-60 sec. Repeat if necessary.	 Massage this point in a circular motion for 30-60 sec. Repeat if needed.
SHOULDER PAIN	KNEE PAIN	STOMATITIS
 Massage these points for 30-60 sec. Repeat if needed.	 Massage these points for 30-60 sec. Repeat if needed.	 Massage these points for 30-60 sec. Repeat if needed.
COUGH	EAR ACHE	TOOTH ACHE
 Massage these points for 30-60 sec. Repeat if needed.	 Massage these points for 30-60 sec. Repeat if needed.	 Massage these points on both hands for 30-60 sec. Repeat if needed.

References:
THE REFLEXOLOGY BIBLE by Louise Kect

Reflexology helps our body to relax and come back to normal in the most natural and scientific way.
It is the solution to our day to day illness, stress, helps improving our mood which is so necessary as today everyone has a hectic, stressful life.
Hence, I believe everyone should bring reflexology to practice and therefore, I came up with a DIY REFLEXOLOGY CHART.

CHOCOLATE : BENEFITS AND RISKS

Chocolate is made from tropical Theobroma cacao tree seeds. After the European discovery of the Americas, chocolate became very popular in the wider world, and its demand exploded.

BENEFIT :

Chocolate's antioxidant potential may have a range of health benefits. The higher the cocoa content, as in dark chocolate, the more benefits there are. Dark chocolate may also contain less fat and sugar, but it is important to check the label.



Eating chocolate may have the following benefits:

- lowering cholesterol levels
- preventing cognitive decline
- reducing the risk of cardiovascular problems

In addition, chocolate bars do not contain only cocoa. The benefits and risks of any other ingredients, such as sugar and fat, need to be considered.

1.Cholesterol

Regular consumption of chocolate bars containing plant sterols (PS) and cocoa flavanols (CF), as part of a low-fat diet, may support cardiovascular health by lowering cholesterol and improving blood pressure."

2.Cognitive function

The researchers found that hot chocolate helped improve blood flow to parts of brain, a cocoa extract, called flavanol, might reduce or prevent damage to nerve pathways found in patients with Alzheimer's disease. This extract could help slow symptoms such as cognitive decline.

3.Heart disease and Stroke

The higher levels of chocolate consumption could be linked to a lower risk of cardiometabolic disorders and people who ate one serving of chocolate were 22% less likely to experience a stroke than those who did not. Also, those who had about two ounces of chocolate a week were 46 percent less likely to die from a stroke.

4.Fetal growth and development

Eating 30g of chocolate every day during pregnancy might benefit fetal growth and development.

Considering that heart disease is the number one killer and that dark chocolate has been shown to substantially reduce risk of cardiovascular disease, I believe regular chocolate consumption can be a good thing. Always choose above 70-percent cacao and select your brand wisely so as to keep your cadmium, lead, and sugar low while maximizing the antioxidant and flavanol benefits.

RISKS AND PRECAUTIONS

- 1.Sugar content: The high sugar content of most chocolate can also be a cause of tooth decay.
- 2.Migraine risk: Some people may experience an increase in migraines when eating chocolate regularly due to cocoa's tyramine, histamine, and phenylalanine content.



- 3.Weight gain: Some studies suggest that chocolate consumption is linked to lower body mass index (BMI) and central body fat. However, chocolate can have a high calorie count due to its sugar and fat content. Anyone who is trying to slim down or maintain their weight should limit their chocolate consumption.



LIGHT VS DARK CHOCOLATE



Manufacturers of light, or milk, chocolate, claim that their product is better for health because it contains milk, and milk provides protein and calcium. Supporters of dark chocolate point to the higher iron content and levels of antioxidants in their product.

The darker the chocolate, the higher the concentration of cocoa, and so, in theory, the higher the level of antioxidants there will be in the bar.

Nutrient	Light (100 g)	Dark (100 g)
Energy	531 kcal	596 kcal
Protein	8.55 g	5.64 g
Carbohydrate	58 g	60.49 g
Fat	30.57 g	32.4 g
Sugars	54 g	47.56 g
Iron	0.98 mg	2.13 mg
Phosphorus	206 mg	51 mg
Potassium	438 mg	502 mg
Sodium	101 mg	6 mg
Calcium	251 mg	30 mg
Cholesterol	24 mg	5 mg

TYPES OF CHOCOLATES:-

1. MILK CHOCOLATE

Creamy and sweet, milk chocolate contains a minimum of 10 percent chocolate liquor and 12 percent milk, which gives it its name and its soft, melty texture. It's typically sweeter and less bitter than dark chocolate because it contains that extra dairy and sugar.



2. DARK CHOCOLATE

Dark chocolate in the 65 to 70 percent range will be pleasantly bitter and slightly creamy, while anything reaching into 80 percent and beyond will be too brittle and bitter to enjoy on its own (unless that's your taste).



3. UNSWEETENED CHOCOLATE

Basically, it's chocolate liquor—cocoa solids and cocoa butter—without any added sugar or dairy. Because of this, it's very bitter and best left for baking projects that require a deep chocolate flavor.

4. WHITE CHOCOLATE

White chocolate isn't chocolate. After all, it doesn't contain any cocoa solids. But it does contain plenty of cocoa butter—at least 20 percent, 14 percent milk, milk solids or cream.



5. CARAMELIZED WHITE CHOCOLATE

Also known as toasted white chocolate or blond chocolate, caramelized white chocolate is basically white chocolate that's been roasted until it caramelizes. The result is a caramel-like flavor that's less saccharine than traditional white chocolate but retains its creamy texture.

6. RUBY CHOCOLATE

Ruby chocolate is kind of like white chocolate's hip younger cousin: It's only been around since cocoa company Barry Callebaut introduced it in 2017 and it's a very trendy millennial pink. Surprisingly, its hue is natural and comes from the "ruby cocoa beans" used to make it. The flavor is slightly sweet and sour, like berries in chocolate form.



7. RAW CHOCOLATE

Raw chocolate is made from unroasted cocoa beans, which manufacturers claim leaves the nutrients and antioxidants intact.



References:- https://www.medicalnewstoday.com/articles/270272#risks_and_precautions
<https://www.purewow.com/food/types-of-chocolate>

HOW OTT SERVICES ARE RUINING YOUR SLEEP CYCLE

STREAMING GIANT CEO SAYS:
SLEEP IS OUR BIGGEST COMPETITION

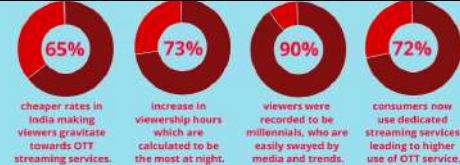
This decade has seen the rise of some of the biggest OTT giants in the world. According to a recent survey, services like Netflix and Amazon Prime Video have acquired an estimate of 430 million paid subscribers combined worldwide as of the first quarter of 2022.

While this is extremely beneficial for the revenue of these companies, the toll exacted from its users is beyond harmful. Not only does it negatively impact a person's mental and social health, but it also affects something far too fragile to be toyed with - our sleep cycle.

THE MAJOR OTT PLAYERS



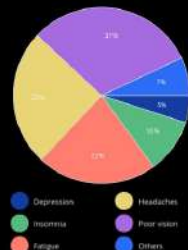
FACTORS AFFECTING SLEEP



THE ADVERSE EFFECTS

BASED ON A SURVEY IN THE JOURNAL: DIGITAL MEDICINE

A RECENT STUDY CARRIED OUT BY RESEARCHERS FOR A PAPER PUBLISHED IN DIGITAL MEDICINE, FOUND OUT THAT PEOPLE WHO SPENT MORE TIME ON OTT PLATFORMS, INCREASED THEIR SCREEN TIMES BY AN ALARMING AMOUNT. THIS LEAD TO MANY COMPLICATIONS IN THEIR HEALTH, INCLUDING THEIR SLEEP CYCLES. THE PIE CHART GIVEN HERE ATTEMPTS TO SHOWCASE THE MOST COMMONLY REPORTED EFFECTS OF SLEEP DEPRIVATION DUE TO OTT CHANNELS AND ONLINE TV SERVICES.



Notes on the above poster:

a. The tools used: Visme, Icons8

b. References: The above scientific and statistical information has been referenced from the following websites-

- <https://bit.ly/3y2WXQD>
- <https://bit.ly/3t05HSX>
- <https://bit.ly/3z2MHXS>
- <https://bit.ly/3z4s0ec>
- <https://bit.ly/3PKowmQ>
- <https://bit.ly/3z3lg07>

c. My inspiration to choose this topic: Nowadays, binge-watching is no longer a trend, it has become a lifestyle. Zooming through multiple hour-long episodes is a necessity. I started noticing during the middle of the pandemic how tired my sister used to wake up at times. It wasn't hard to narrow it down - she was obsessed with watching unending seasons of her favourite shows. This even led to a trip to the ophthalmologist's office. When I was given a chance to make a project, no holds barred, I knew I had to research the sleep cycle and the adverse effects OTT platforms have on it.

d. My learning from the topic: This project helped me understand how important sleep can be to our daily life. It is no secret that proper rest is required for a healthy work-life balance, but going through scientific research made me realise that our sleep schedule has so much more importance on our overall health than just the eyes and the brain.

Notes on the course:

a. Why this course is important: Visme, Icons8 I believe that Scientific Communication is an important part of future career endeavours. It helps the learner gather practical information about interacting outside our comfort zones in a very professional and coherent manner.

b. My learnings from this course: My main takeaway from Scientific Communication has been condensing scientific jargon into easier language for myself and others. This course has helped me understand and compile research papers for easier perception. I have learned how to better present my information aesthetically and professionally.

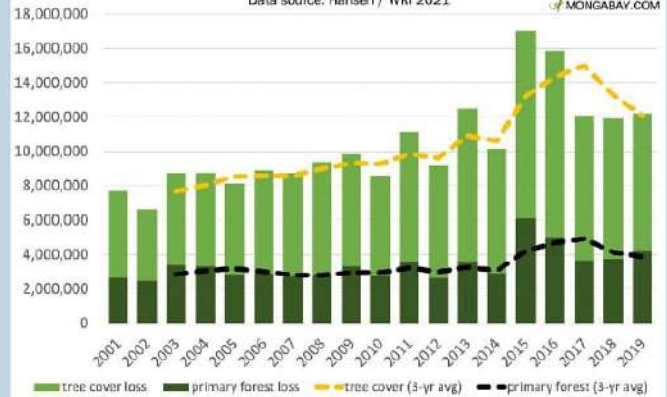
Infographic by Ritwika Sen

DEFORESTATION

Tropical primary forest & tree cover loss, 2002-2020

Data source: Hansen / WRI 2021

MONGABAY.COM



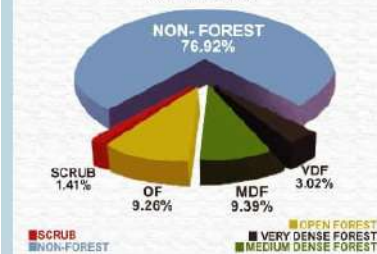
Effects of deforestation-

climate change, desertification, soil erosion, fewer crops, flooding, increased greenhouse gases in the atmosphere and a host of problems for indigenous people, wildlife extinction, water cycle disruption.

Facts about deforestation-

- We lose around 10 million hectares of forest every single year.
- Beef is responsible for 41% of global deforestation.
- Deforestation contributes about 4.8 Billion Tonnes of carbon Dioxide a year.
- Chocolate and biscuits are major contributors to deforestation.

Forest Cover of India



Solutions to deforestation-

- Government regulation
- Banning clear cutting of forests
- Reduce consumption of paper
- Forest friendly companies
- Reforestation

Infographic by Sneha Yerande



Anushka Tatewar

QR code to
the linked
blog



SCIENCE has gone so far that it has made huge progress in understanding the human brain and how it functions. For example, we know that the frontal lobe is responsible for self-control. We also know that neurotransmitters, or brain chemicals, are responsible for our moods and the behavioral state we are in. To read more about this, here is my small blog regarding brain and behaviour. Below is the link for my blog. Do check it out!

<https://lnkd.in/d5KQzv9B>



Anwayee Tamane

QR code to
the linked
blog



3D food printing—cool!! Isn't it? From 3D printed robot parts to food, 3D food printing is a revolutionary technology in the field of tech. Want to know more about 3D food printing? The link to my blog can be found below.

3D Food Printing
<link.medium.com>



shravani_1883

QR code to
the linked
blog



The science behind Yoga

Do u ever wonder why the Indian culture or our ancestors force us to learn yoga? It's cause there are significant scientific reasons behind these exercises! Yoga is an essential spiritual discipline based on an extremely subtle science. It is a group of physical, mental, and spiritual practices of disciplines which is originated 5000 years ago in the history of Indian philosophy. To know more about this phenomenon, do read my blog!

<https://sites.google.com/dypiu.ac.in/shravani-nirgude-blog-01/home>

Link in bio too.

Thank you!

“ Was the best event, loved the event and you all for organizing such a knowledgeable event. Keep organizing more events like this! ”

“ I loved the series of games and the exhibition. ”

“ The event was great, as a first year student, it was a really good event which lowkey worked as an ice breaker for me personally. So yeah, overall, amazing event! ”

“ I never knew that an idea can gradually become better and better by discussing with a group! This shows that if you are teamed up with the right people, then a basic idea can also shine out by mixing others suggestions and perspectives on 1 single task. ”

“ I'm glad I don't have any criticism from my side and I'd love to be a bigger part of this from next time onwards! ”

“ The ideas presented were really good by the teams... it felt great to contribute to solve common issues related to our college. ”

“ 3D printed creations and the stensegrity model were amazing!! ”

“ The games was a fun way to learn new names when it came to spellings, anatomy and the dumb charades. Quite a lot of information/knowledge along with fun stuff. ”

“ Really fun and interactive...would love to be a part of it again if possible. ”

“ I learnt some really interesting new things and had a first hand experience of how university life can be, not just in terms of studies. ”

CONTACT US



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